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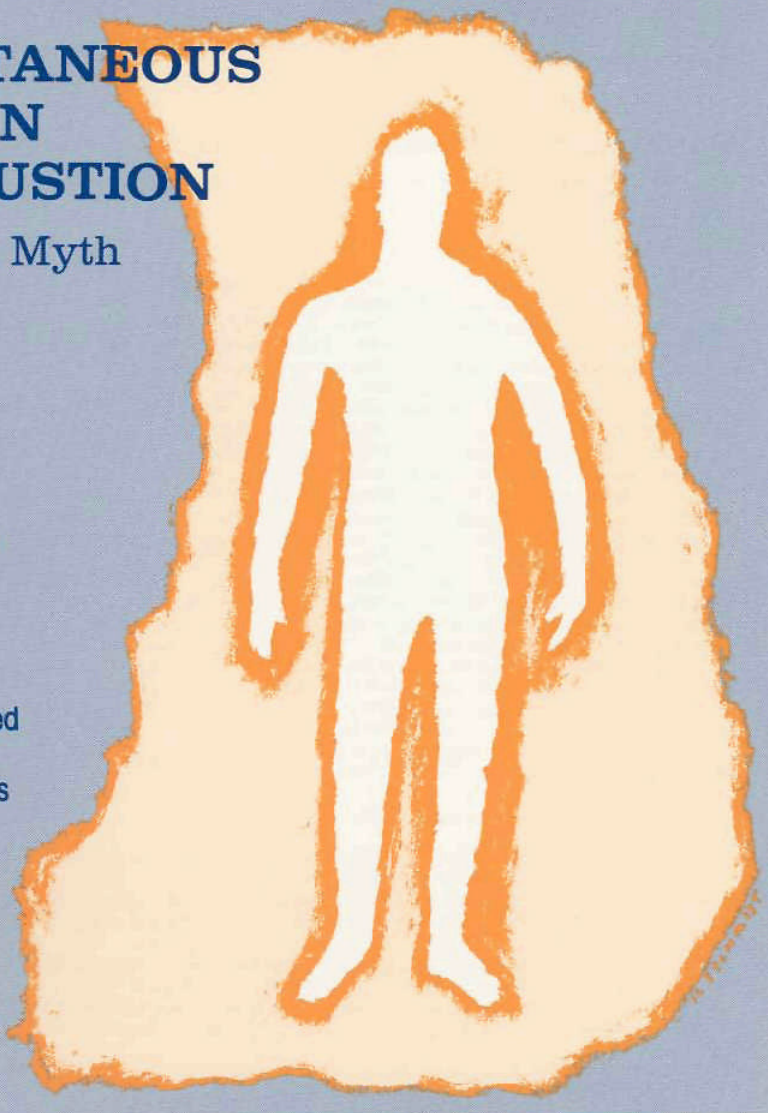

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Special Reports

FAA Data Sheds New Light On JAL Pilot's UFO Report

Philip J. Klass

THE UFO MOVEMENT, suffering from an extended drought of exciting new UFO incidents to attract media and public interest, got a sorely needed shot in the arm in early January, when it was disclosed that the pilot of a Japan Air Lines 747 cargo airliner had reported an encounter with a giant UFO over Alaska on November 17, while flying to Anchorage from France. The incident had occurred in twilight conditions, starting about 6:15 P.M. local time, with the sun about 11 degrees below the horizon.

According to initial press reports, the incident seemed a classic. The principal witness was an experienced captain, Kenju Terauchi, whose reported visual observations seemingly were confirmed by a USAF/Federal Aviation Administration radar. Additionally, the UFO seemingly paced the JAL 747 for more than 40 minutes, offering an extended period for observation by two other crew members of the cargo aircraft loaded with French wine destined for Japan.

Important new insights into the incident have since emerged as a result of the FAA's wise decision to offer a complete data package to the public at modest cost. The available data includes a verbatim transcript of the JAL pilot's tape-recorded radio communications with FAA controllers during the incident, tape recordings and transcripts of FAA interviews with the three JAL crew members in early January, about six weeks after the incident occurred, and a copy of the revealing report that Captain Terauchi submitted to the FAA, also in early January.

In releasing all available data on the incident, the FAA's Alaskan Region public affairs officer, Paul Steucke, noted that his agency "does not have the resources or the Congressional mandate to investigate sightings of unidentified flying objects. We have not tried to determine what the crew of Japan Air Lines flight #1628 saw based on scientific analysis of the stars, planets, magnetic fields, angle of view, etc."

During the initial phase of the November 17 UFO incident, a long-range USAF/FAA radar sporadically seemed to show a *single* blip in the vicinity of the 747's radar blip—at a time when the pilot was reporting seeing *several* UFOs. Fortunately, the FAA records radar data (for subsequent analysis in event of a mid-air collision or a near-miss), and it was sent to the FAA's technical center near Atlantic City for analysis by radar specialists, to determine if the long-range USAF/FAA radar had indeed detected

an unidentified object in the vicinity of the JAL 747.

This analysis showed that the sporadic second blip was due to a phenomenon known as "uncorrelated primary and beacon target," which can occur if the radar energy bouncing off an aircraft does not arrive at precisely the same instant as the signal transmitted back by the aircraft's radar transponder. According to FAA specialist Dennis R. Simantel, who analyzed the data, "these uncorrelated primary returns are not uncommon due to the critical timing associated with the delay adjustments in the aircraft transponder . . . and the target correlation circuitry within the radar equipment."

The FAA data package reveals Terauchi to be a "UFO repeater," with two other UFO sightings prior to November 17, and two more this past January, which normally raises a "caution flag" for experienced UFO investigators. The JAL pilot is convinced that UFOs are extraterrestrial and when describing the light(s) Terauchi often used the term *spaceship* or *mothership.*

During his January 2 interview with FAA officials, Terauchi said that he believed the "mothership" intentionally positioned itself in the "darkest [easterly] side" of the sky because "I think they did not want to be seen." This enabled the UFO to see the 747 "in front of the sunset and visible for any movement we make." In his report to the FAA, he expressed the hope that "we humans will meet them in the near future."

Terauchi, who was based in Anchorage at the time but has since been transferred back to Japan, noted in his report that his flights over Alaska "generally [are] in the daytime and it is confusing to identify the kind of lights" in darkness. As an example, he described seeing lights from an Alaskan pipeline pumping station reflecting off snow-covered mountains, which initially puzzled him.

(On January 11, a few days after Terauchi gave FAA officials his recollection of the November 17 incident, he again reported spotting unusual lights in roughly the same area while on a repeat flight from Paris to Anchorage. The JAL captain, who has a limited verbal facility in English, asked to record his description of the January 11 UFO in Japanese. Its translation, included in the FAA's data package, resembled Terauchi's description of the UFO initially sighted on November 17: "We see irregular pulsating lights just there is a large black chunk [*sic*] just in front of us. Distance is five miles. It seems to be a spaceship, ah UFO." The pilot reported a similar sighting a few minutes later. But when the USAF/FAA radar failed to confirm the presence of any object, he and the FAA later agreed that these January 11 UFOs were merely lights from small villages being diffused by thin clouds of ice crystals.)

Captain Terauchi, who quickly became an international media celebrity, provided colorful accounts of the incident. But he always failed to mention that two other aircraft in the area that were vectored into the vicinity of the JAL 747 to try to spot the UFO he had been reporting were unable to see any such object. This is revealed in the transcript of radio communications between Terauchi and FAA traffic controllers and their communications with the flight crews of United Airlines flight #69 and a USAF C-130 transport.

United #69 was headed north from Anchorage to Fairbanks at the time that JAL #1628 was headed in the opposite direction along a parallel airway to Anchorage. The FAA asked the United pilot if it could vector him slightly to the left of his intended path, to bring him within several miles of JAL #1628, to see if he could spot and possibly identify the "UFO." As United #69 approached, Terauchi reported the bright light to be at his "nine o'clock" position—roughly broadside and to the left at an estimated distance of about ten miles.

The United captain agreed, and Terauchi was asked to turn his landing lights on briefly to help the United crew

UFO sighting by pilot confirmed by radar

Airliner crew reports strange lights

Strange Encounter Over Alaska

Was an FAA-confirmed sighting really a UFO?

UFO sighting reported by JAL jet crew

Jet pilot's report of UFO verified on radar screens

locate the JAL airliner. The United crew, looking ahead and to its left, readily spotted JAL, silhouetted against a still faintly light sky, but could not see any luminous object in its vicinity. Shortly before the two aircraft passed, Terauchi was asked again to give the UFO's position, and he reported that it was "just ahead of United"—which would place the bright light to the southeast. Despite the fact that the bright light seemed to Terauchi to be directly ahead of the United jetliner, its crew saw nothing.

In the southeasterly direction, where Terauchi was then looking, was the very bright (-2.6 magnitude) planet Jupiter, which was low in the sky (about 12 degrees) at an azimuth of about 143 degrees relative to true north. From Terauchi's vantage point, Jupiter would appear to be just ahead of United #69. But the bright planet would have been far to the *right* of United's flight path, and its crew would have been looking to their *left* at JAL #1628. Never once did Terauchi report the "UFO's" position relative to a "very bright star," i.e., Jupiter.

Also in the area at the time was a USAF C-130 transport aircraft that was westbound for Elmendorf AFB, flying south of JAL #1628. When the C-130 pilot overheard the FAA communications with JAL, he too offered to try to spot the reported UFO when the USAF aircraft passed near the 747. The USAF crew readily spotted the JAL 747 but reported seeing no other object in its vicinity. The C-130 crew would not have noticed Jupiter, which was to their far *left*, because they were looking at the JAL 747 to their *right*.

While it is commendable that the FAA's Alaskan Region decided to conduct tape-recorded interviews with the three JAL crew members in early January, following inquiries by Japanese news media in late December, in retrospect it is regrettable that the FAA did not think to tape-record discussions with the crew immediately after flight #1628 landed in Anchorage on November 17, when recollections were still fresh. However, when crew members were interviewed separately in January, some significant differences emerged, providing useful insights.

For example, it now appears that the November 17 incident involved two different "types of UFOs," or trigger-mechanisms. As described by flight

engineer Yoshio Tsukuba (through an interpreter) during his January 15 interview with FAA officials, the initial UFO was observed for about five to ten minutes at roughly an 11 o'clock position before it disappeared. This is confirmed by the FAA radio communications transcript, which shows the pilot reported the UFO disappearance at 0223:13 GMT, roughly four minutes after it was first reported. Crew members had been observing it for several minutes prior to the initial report.

The second UFO, which Tsukuba characterized as "absolutely different" was visible much further to the left ("nine o'clock") for about 30 or 40 minutes. Tsukuba described the initial UFO as a "cluster of lights . . . undulating," which were "different from town lights." Unlike the pilot, Tsukuba said he was unable to describe any particular shape for either UFO. The flight engineer said that, when he was first interviewed by the FAA immediately following the incident, he "was not sure whether the object was a UFO or not. My mind has not changed since then."

During FAA interviews in January, copilot Takanori Tamefuji, who was flying the 747 at the time of the initial sighting, confirmed the flight engineer's recollections that the UFO first sighted was "completely different" from the one later seen further to the left. Tamefuji described what at first appeared to be "two small aircraft" slightly below his own altitude. When the copilot was asked if he could distinguish these lights "as being different" from a star, he replied: "No." (The planet Mars would have been visible to the crew about 19 degrees to the right of Jupiter, but it would not have been nearly as bright.)

When a sketch made by Captain Terauchi, showing a giant walnut-shaped UFO, was shown to the copilot and he was asked if this was what he had seen, he replied: "I don't see anything like this but . . . if we can connect these lights it [would] be a big object, but ah . . ."

There are a number of ambiguities in the report that Captain Terauchi submitted to the FAA on January 2, and in his subsequent interview with an FAA representative, despite the presence of an interpreter. Terauchi generally characterized the initial amber-white lights as resembling the exhaust of jet or rocket engines. In his report, written in Japanese and later translated, Terauchi said that a few minutes after first observing the lights ahead and to the left, "most unexpectedly two spaceships stopped in front of our face, shooting off lights. The inside cockpit shined [*sic*] brightly and I felt warm in the face." Neither of the other crew members reported such effects.

All three crew members agreed that the 747's weather radar displayed an echo at a bearing that roughly corresponded to that of the initial lights at a range of about eight miles. The radar display uses color to show the strength of the echo to alert the crew to the potential intensity of thunderstorm turbulence ahead. A red-colored echo indicates an especially strong radar echo and a green color shows the weakest. All three crew members agree that the "UFO blip" was *green.*

This is especially curious if the visual UFO was a giant craft only a few miles ahead, which should have produced an extremely strong (red) return. Flight engineer Tsukuba characterized it as "not a dot, but streamlike." This is confirmed by a sketch drawn by the pilot after landing on November 17. It suggests that the green "blip/stream" was an echo from thin clouds of ice crystals—like those that prompted Terauchi to mistake village lights for UFOs on January 11.

On the night of November 17, there was a nearly full moon that would have been approximately 12 degrees above the horizon at the time of the initial UFO sighting and almost directly behind the JAL 747's direction of flight. This raises the possibility that bright moonlight reflecting off turbulent clouds of ice crystals

could have generated the undulating flame-colored lights that Terauchi described.

It would also explain why the undulating lights would periodically and suddenly disappear and then reappear as cloud conditions ahead changed. When the aircraft finally outflew the ice clouds and the initial "UFO" disappeared for good, Terauchi would search the sky for it, spot Jupiter further to the left, and conclude it was the original UFO.

This case is likely to become a classic in the UFO inventory because many people assume that a senior airline captain could never mistake a bright planet or other prosaic object for a UFO. Yet when the late Dr. J. Allen Hynek re-analyzed UFO reports in the USAF files, he found that pilots were as readily misled by prosaic objects as persons in other professions. Numerous air-accident-investigation reports by the National Transportation Safety Board confirm that even *experienced* pilots are not infallible.

I am indebted to astronomers Nick Sanduleak and C. B. Stephenson, of Case Western Reserve University in Cleveland, for their valuable assistance in computing positions and bearings of bright celestial bodies relative to the JAL 747 airliner at the time of the November 17 incident. •

Philip J. Klass, who was a senior editor with Aviation Week & Space Technology *magazine for nearly 35 years until his partial retirement in June 1986, has been investigating famous UFO cases as a hobby for more than 20 years. His most recent book is* UFOs: The Public Deceived, *published by Prometheus Books.*

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The Unmasking of Psychic Jason Michaels

Richard Busch

In the early months of 1986, Jason Michaels, of Grove City, Pennsylvania, had reached his psychic peak. He had made the most of the nationwide publicity resulting from his apparent ability to predict the future. His most notable supposed predictions were the DC-8 Gander, Newfoundland, air tragedy the previous December, which killed 248 American soldiers, and the Challenger space shuttle disaster in January, in which the crew of seven died. While any performer is expected to appear on stage and entertain, Michaels was claiming real powers and doing so from TV and radio newsrooms and through the wire services. Our Paranormal Investigating Committee of Pittsburgh (PICP) in fact first heard of Michaels on the KDKA-TV news. While we believed that such precognition might be possible, we wondered if Michaels was employing physical or psychological deception. Would he agree to be tested? And what, if anything, would be proved?

When I reached Michaels by phone, the first question I asked him was, "Are you a true psychic or do you entertain with trickery?" His answer then and in subsequent signed statements was firm and clear: His psychic powers were real despite any showmanship used on stage to entertain. Yes, he wanted to be tested by us, although he waived any rights to PICP's offer of $10,000 for validation of a psychic feat under controlled conditions, claiming he could easily win any such prize if he wanted to. We believe that a letter of scientific validation from our Committee members would be worth much more than $10,000 in publicity and credibility.

Michaels agreed, in writing, never to consider the Committee an audience and never to use showmanship. He would "not engage in trickery, magic tricks, or deception of any kind in any manner, not even once, for any reason" in his work with PICP. His psychic power, he asserted, was "not dependent at all, in any way, on magical techniques or any deception or trick." He would never "cheat in any way for any reason in order to achieve a positive result." Everything done would be "real." He also agreed that the Committee's presence in the testing areas would not inhibit his abilities or create any negative vibrations.

Thus Jason Michaels, who, in his words, wanted "worldwide fame" and to be "bigger than Uri Geller," began his campaign to convince us of his claims. According to Michaels, he had already been tested and validated by Berthold E. Schwarz, a psychiatrist and psychic researcher in Vero Beach, Florida.

Our testing of Michaels was essentially accomplished in three parts: a preliminary interview in the office of Donald McBurney, a University of Pittsburgh psychologist; a formal taping session in psychologist Mark Strauss's infant-development laboratory at the university; and dozens of phone conversations between Michaels and me. It seems he found me "comfortable" to be around. He said he could work with me more easily than with almost anyone he had ever met in his life. He invited us to consult a local magician to verify his honesty and even agreed to pay $5,000 to any magician to duplicate what he does under identical conditions. He did insist, however, that James Randi be kept away.

Michaels was evidently quite pleased with his work with PICP. He mentioned us not only to others in the field around the country but to reporters as well. He

actually boasted in print that we had "been unable to explain" his miracles and that "the videotapes have been studied minutely by experts and no clue has been found." However, he was not pleased with our inability to react as lay people. He apparently expected us to foolishly rush to proclaim him "genuine" without the necessary replication that he promised and never delivered. So, fearing he wouldn't get all the quick recognition he felt he deserved, Michaels tried another plan of attack.

Using the name "John," he called Paul Kurtz, chairman of CSICOP, while Kurtz was participating in a nationally syndicated radio talk-show on July 16. He falsely accused PICP and me, by name, of many things, including "suppressing" positive evidence. His accusation had to be met quickly and openly. We couldn't wait for further testing.

A press conference was arranged for September 15, 1986, at the University of Pittsburgh. Michaels and his manager, Bob Koch of Tonawanda, New York, were invited to be present. Koch, who told me Michaels could "do things that no other human being could do," insisted that Randi and Kurtz be banned from the conference.

We hoped for a good media response, but the big question was, Would Michaels be there? Could he resist such a chance for publicity? What superpsychic could? The media turnout was excellent and, yes, Michaels was there and so was the "suppressed" evidence: videotapes showing Michaels performing effects well known to magicians and mentalists.

- Spoonbending (psychokinetic metal-bending, or PKMB): Both overhead and hand-held cameras showed the illusion of "genuine" metal-bending. Michaels actually saw replays of the tape during the taping session and assumed he had pulled off his deception well. However, we had hidden a camera behind a oneway mirror, and it had caught Michaels bending the spoon by pressing it into his stomach as he turned his back on us to drink from a rear-positioned can of soda. A second bend made with his hands was caught on tape as well. During the press conference, I duplicated all of the bends and manipulations exactly as he had made them.

- Keybending (PKMB): Three "miracle" bends were demonstrated on the tape. However, the hidden camera, operated by PICP's Peter Gordon, showed Michaels bending the key behind his back, and ours. This bend prematurely "flashed" before the bending was even to have begun. As before, I performed all of these bends and manipulations for the media exactly as he had done them. Michaels tried to instill doubt in the minds of the reporters by challenging me, on the spot, to bend a key he offered me. I was only too happy to oblige and received a cheer from members of the media when I held up the key next to the one he had previously bent. They matched. I asked Michaels if he hadn't bent the key the same way I had. His only reply was: "No comment."

- Mind-reading by Phone, I: I thought of various objects and Michaels correctly named them—a standard effect by mentalist Gene Grant.

- Mind-reading by Phone, II: I thought of a card, and Michaels named it correctly—a well-known method by Richard Himber.

- Eyeless Vision (Blindfold): Michaels used an advanced method (not the nose peek). Our tape reveals how sight was accomplished as Michaels got a little careless and inadvertently exposed his own method.

- Thought Projection by Phone, I: PICP's Mark King was in isolation with Michaels. Only after the target, a slide rule, was named did he reveal the name and phone number of his wife—"Sherry Lynn"—which he had to look up in his datebook! King reported that Michaels carelessly kept mumbling "Sherry Lynn, small and thin" repeatedly. "Sherry Lynn"

was obviously his means of coding the object to his wife. While I had "Mrs. Michaels" on the phone, she was able to guess the general shape but was not permitted to "fish" or receive feedback and failed to come up with the correct response. As an excuse, we were later informed that Michaels never had done well in calculus!

• Thought Projection by Phone, II: A playing card was selected by my wife, Cynthia, and Michaels tried unsuccessfully to send it telepathically to Bob Koch. We have his exact code in our possession.

• Card Manipulation: Michaels is seen on the tape using standard sleight-of-hand moves, such as the spectator peek, the double undercut, and the Hindu shuffle, to name only a few.

• Number Premonition: Michaels used the well-known "magic square" principle and a gimmicked wallet. I noticed this and secretly exposed the gimmick to our Committee right under his nose.

• Signature-in-Envelope Test: This simple trick uses a method found in many commercial effects.

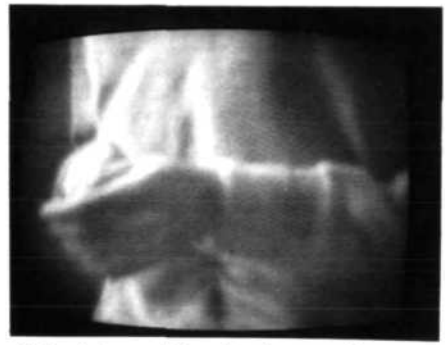
• Billet and Message Reading: Michaels did poorly and really should have scored better since he used an Al Mann method in one instance and in another was given the same envelope I had successfully "read" during a previous performance.

• Levitating Match: This trick has been on the market in this form for years. Even though we were asked not to consider this feat a part of his demonstration, we feel its inclusion in the lab and in our photographic record speaks for itself since he had agreed never to use trickery.

Michaels did some other, minor things for us. Still other psychic claims, such as the ability to levitate himself and become invisible, were only referred to and not demonstrated. But what of his claim to predict the future?

We had agreed to accept premonitions from Michaels only if they were specific, if they were in writing, and if we received them in advance of the incident. Never once did he comply. He would call and make vague predictions, almost always

Michaels (*right*) displaying the intense energy and concentration he claims is necessary to bend a spoon as Richard Busch (*left*) looks on.



Michaels is caught bending the spoon by pressing it into his stomach. Note the vertical line of depression in his sweater. The videotape shows the live action clearly.

Michaels tips an already bent spoon slowly forward and creates the illusion of the bending process.

of a tragedy. After one prediction that involved a political assassination to take place "somewhere" within 60 days, he called back claiming a hit in just a few hours. Another time, he wanted us to verify a written prediction he had made for a supermarket tabloid, but we could neither read nor even keep the prediction! Thus Michaels was never tested by PICP for his predictions in an acceptable, scientific manner.

Michaels used a mixture of ideas to bring about his "predictions." One principle comes from the 1947 *Miracle Prediction of the Age,* by Robert A. Nelson. Another factor is that there are only so many possible headlines, and they tend to repeat themselves. The late David Hoy used to make his "predictions" verbally, using this very technique. Michaels's ploy of "having them read in advance" is magically interesting but not paranormal.

At the press conference, we concluded that Jason Michaels had presented us no evidence of any psychic ability. Our data clearly indicated the use of trickery and deception in *all* the demonstrations that he had referred to as having been performed under "test conditions."

When the reporters questioned Michaels, he called our remarks a "bunch of bull." He refused to bend a spoon or do anything "psychic" for an immediate $10,000 that he could donate to charity. In fact, he now claimed to have lost all his powers with the exception of precognition. Like Hoy, he threw out a verbal headline two years into the future. As Dr. McBurney pointed out, this was safely far ahead of all the reporters' deadlines. Michaels picked the one "claim" we had not tested in the past and could not witness in the near future. He dodged all the specific questions about the videotapes showing him cheating.

Michaels refused to pay us his $5,000, even though we had duplicated everything he had done for us in testing. Both his offer and ours involved only what was done in the lab. Just as he was free to use deception on the stage, I was under no obligation to perform any unseen miracle after the fact.

Michaels broke other earlier agreements as well. Back came all the "negative vibrations." Now he couldn't do anything psychic because of—*me!* But, in the end, after much questioning from the reporters, Michaels finally admitted to having used deception in the lab.

Magic, mentalism, and illusion are needed in this world, but they belong on the stage and not in the newsroom or in the university laboratory. Genuine precognition should have warned Jason Michaels of his own exposure and even prevented it. And so the psychic who tried so hard to gain fame and fortune at the expense of academic reputations and international tragedies finally paid his dues before the very same media he had hoped to conquer. •

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Postscript: On March 3, 1987, the Associated Press reported that Jason Michaels had been sued by the Pennsylvania Attorney General's Office in Mercer County Court, Mercer, Pennsylvania. The suit charged that Michaels falsely claimed he ran a charitable enterprise with the support of local authorities to raise funds for a purported drug education show. "By claiming to have endorsements which don't in fact exist," Michaels's project "has created illusions that our suit alleges are designed to deceive the public," said Attorney General LeRoy S. Zimmerman. —ED.

Richard Busch is chairman of the Paranormal Investigating Committee of Pittsburgh, a mentalist, and a CSICOP consultant.

News and Comment

Mysteries and Millions: Time-Life Books Launches 20-volume Series on the Paranormal

TIME-LIFE Books' new series on the paranormal, *Mysteries of the Unknown,* "won't be sensational," says series editor Russell Adams. Adams, who describes himself as a regular reader of both the SKEPTICAL INQUIRER and *Fate* magazine, explains that the series will present the paranormal as "social-historical phenomena." "We're not setting out to debunk, although if something is patently wacky we won't suggest that we believe it or tell our readers they should believe it," he says.

The first book in the series will be published in August. Entitled *Mystic Places,* it will cover such topics as Stonehenge, the Pyramids, and the Bermuda Triangle. Future volumes will appear about every other month, Adams says. The series is expected to include 20 volumes, but that figure is still subject to revision.

When the project was proposed, the editorial board at Time-Life expressed some concern about how the subject would be handled. Promotional packages for the series, which appeared in 1985 and again in early 1987, seem to justify that concern: The promotional copy is openly pro-paranormal. For example, a "Dear reader" letter, signed by Time-Life Books President Chris Linen, in the most recent package begins:

> A psychic describes what is happening hundreds of miles away. . . . A pet dog makes its way from Vancouver to Tokyo to find its master. . . . Dogon Africans map the star-system Sirius with staggering accuracy. . . . Ancient artifacts hint at a knowledge of electricity. . . . Tibetan lamas create solid objects by a form of thought projection. . . .
>
> Is some unknown force allowing these things to happen? And have you yourself ever had the feeling that you lived another life in the remote past . . . that you once saw a UFO . . . and you simply can't dispel the idea that there is more to the world than can be explained by conventional science, then . . .
>
> Come explore the mysteries of unexplained phenomena through the pages of Time-Life Books' unprecedented new series.

The blurb for *Mystic Places* invites subscribers to learn "where experts now place" the location of Atlantis and to "enjoy a vivid reconstruction of what life may have been like in its glittering capital." Adams points out, however, that the

Part of glossy four-color fold-out touting Time-Life Books series.

Front of the promo package.

promotional copy for the series is advertising hype that shouldn't be taken too seriously. In reality, he says, "the books will not be sensational at all, at least in our opinion."

General consultant for the series is sociologist Marcello Truzzi. Although he was associated with CSICOP in 1976 and 1977, Truzzi generally takes a less critical view of paranormal claims and their proponents. He has worked with the Time-Life staff reviewing book outlines and reading manuscripts. In addition, Time-Life has hired "individual experts" to review material that relates to their specialty. Information for the books has been gathered by freelance researchers; as an example, Adams cites the section on the Pyramids from *Mystic Places,* which was researched by a graduate student in Egyptology.

The series will take a lighter approach than that of the SKEPTICAL INQUIRER, Adams says. "The books are intended as entertainment, presenting vivid stories about interesting incidents." If hoaxes are covered, they'll be presented as "a story, not a matter of belief," he says.

Where will Time-Life draw the line in deciding what to include? Adams gives the example of J. Z. Knight, the channeler, who supposedly speaks in the voice of a prehistoric warrior. "If this had happened years ago, it would be a quaint story, but since it's current, we won't go into what is obviously, at least to my

mind, a hoax."

Time-Life Books expects to sign up 100,000 subscribers to the series. Figuring a 20-volume series at a cost of $14.99 for each book (the price of the first volume), that could put a total of nearly $30 million in the Time-Life coffers.

Adams describes the typical subscriber to the series as someone who is curious about the paranormal, whether he or she is a believer or doubter. His goal, he says, is to provide readers with a product "that won't insult the believers with skepticism and won't insult the skeptics with its credulity."

—*Lys Ann Shore*

Lys Ann Shore is a writer and editor in Socorro, New Mexico.

Mainlining of Mysticism: Poll Shows New Popularity

ACCORDING to a new national poll, two-thirds of all adults (67 percent) report having had a psychic experience. Nearly half (42 percent) believe they have been in contact with someone who has died. Nearly a third (31 percent) say they have experienced clairvoyance, and 29 percent have had visions.

These are among the results of a national survey done by priest-sociologist-novelist Andrew Greeley and his colleagues at the University of Chicago's National Opinion Research Council (NORC) and reported in the January-February *American Health.*

The figures are all considerably higher than in a similar 1973 poll. In the article "Mysticism Goes Mainstream," Greeley says he thinks the increase is not because the incidence of such experiences is rising but because people are now more willing to admit having such experiences.

Shirley MacLaine's recent books may have contributed. "Partly because of her and others, millions are less afraid to talk about the experiences," writes Greeley. He contends he has no vested interest, religious or sociological, in the metaphysical reality of these experiences and says he, like the Roman Catholic church of this era, is profoundly skeptical of paranormal phenomena.

"But even though I've never had a psychic or mystical experience myself, most Americans have. We saw this in our first study in 1973 and in data from a repeat survey we have just analyzed. . . . More people than ever say they've had such experiences." The poll of a national sample of 1,473 adults was carried out in 1984. Greeley did not explain the delay in publishing the results except to note that he had only recently finished work with the data.

"If these experiences are signs of mental illness, our numbers would show the country is going nuts. What was paranormal is now normal. . . . Our studies show that people who've tasted the paranormal, whether they accept it intellectually or not, are anything but religious nuts or psychiatric cases."

Greeley notes that many, particularly in academia and the media, "find it unthinkable that a sizable proportion of the people they see every day believe they have experiences outside the accepted limits of science. . . ." But they do.

Despite his protestations of personal disbelief, Greeley says the experiences reported in these surveys have led him to include such themes in his novels. "To pretend that such perceptions do not occur to ordinary people in everyday life is like a Victorian novelist pretending that sexual intercourse does not occur."

Here and elsewhere Greeley makes little effort to differentiate between people's culturally influenced interpretations of their "mystical experiences" and any external physical reality.

For those who consider acceptance of the paranormal a disturbing trend indicative of public credulity and wide-

spread misunderstanding of science and psychology, Greeley has an even more troubling and controversial conclusion: "Our work confirms . . . that these experiences are common, benign and often helpful. What has been 'paranormal' is not only becoming normal in our time—it may also be health-giving."

As if Greeley's survey results aren't enough, his article in *American Health* is followed by one about Shirley MacLaine that hops willingly on the New Age bandwagon. It treats her as a pioneer. "One woman, more than anyone else, has had the audacity to break the silence and bring the forbidden subject into the limelight. Actress Shirley MacLaine believes that her pals in the spirit world have selected her to 'channel' the word of a new/old enlightenment to a skeptical age."

These articles appeared just before the showing of ABC-TV's miniseries based on MacLaine's books, *Out on a Limb* and *Dancing in the Light*. Although dumped on by critics and the goat of jokes by Johnny Carson and others, MacLaine, it appears, has helped spread and popularize the gospel of mushy "New Age thought" (however it may be defined) about as widely as any fringe science or pseudoscience of recent decades.

—*K.F.*

The Curious Case of Omni's Column Criticizing CSICOP

THE FEBRUARY 1987 *Omni* carried a curious "Continuum" column making a number of strong criticisms of CSICOP and implying that it censors the paranormal. The column was written by Jerome Clark, a UFO journalist and devotee of what he calls "anomalies," "things . . . that don't fit." Clark is associate editor of *Fate* magazine, which is devoted almost entirely to paranormal and occult matters.

Several of the incidents Clark recounted had in fact only a marginal relationship to CSICOP as an organization. For instance, in 1985 CSICOP immediately severed any association with a Philadelphia resident mentioned in the column whose tactics and approach to combatting the paranormal it considered inappropriate. Clark knew that, but did not mention it. Clark's column gave similarly distorted and misleading accounts of several other incidents.

Mark Plummer, CSICOP executive director, and Executive Council members Martin Gardner, Kendrick Frazier, and Philip J. Klass all sent letters of protest to *Omni,* pointing out numerous errors in fact and interpretation. Plummer noted that CSICOP invites opponents to present their cases at its conferences, where many controversial issues are discussed and debated. "We are opposed to censorship in any form whatsoever, and are committed to free and open scientific inquiry," Plummer concluded.

In his letter, Frazier said that, contrary to the caricature presented in Clark's column, CSICOP and the SKEPTICAL INQUIRER strive to ensure that the scientific view is represented. "We want to ensure that the actual results of responsible scientific inquiries and well-planned critical investigations get to the public along with all the misinformation and nonsense that is so readily published. We promote the values of scientific inquiry and critical thinking."

Klass said several statements and implications in the column about his involvement in a controversy over a UFO conference were malicious and known by Clark to be false.

Judging from copies of letters sent to us, several readers of *SI* also wrote to *Omni* to protest the distortions in the column.

It was not clear what, if anything, would result.

Ironically, the column appears in the same issue with strongly pro-science arti-

cles on science and creationism and the science-textbook controversies. Editor-at-large Dick Teresi told Frazier in a phone conversation that *Omni* had needed something involving censorship by science to lead off and contrast with the rest of the section. He did not make clear how CSICOP's efforts to evaluate already published and broadcast paranormal claims constitute censorship.

Teresi also suggested the possibility of *Omni* giving CSICOP and "the other side" (representatives unspecified) equal amounts of space in a future issue and "let you have at each other." This didn't seem a fair offer, as CSICOP's complaints concerned a column *Omni* had already given space to. Furthermore, CSICOP is not a homogenous institution with an "official" point of view.

CSICOP Chairman Paul Kurtz said he was concerned about the distortions but considered the column an anomaly. He pointed out that the abundant world-wide news and feature coverage of CSICOP and its activities has been accurate and overwhelmingly positive.

—*Kendrick Frazier*

Psychics' Imagined Year Fizzles (Again)

SAN FRANCISCO was not struck by a severe earthquake in March 1986. Madonna and Princess Diana did not have babies in 1986. There was no assassination attempt against Mikhail Gorbachev, New York City was not blacked out for 16 days, and, alas, there was no vaccine or cure developed for AIDS.

These were just a few of the specific predictions made by well-known psychics for the year 1986 that failed to happen, compiled by the Bay Area Skeptics in their annual look-back at the predictions self-proclaimed psychics made for the previous year.

The results suggest that, in their eagerness to make attention-catching predictions, the "professional psychics" did significantly worse in foreseeing the events of 1986 than a seasoned news reporter or an educated person following the news would have done.

Perhaps more significantly, no "psychic" succeeded in predicting the genuinely surprising news stories of 1986, for example, the Challenger disaster, the ouster of Ferdinand Marcos, the Daniloff affair, or the secret arms deal with Iran and the funneling of funds to the Contras.

Out of the hundreds of predictions the "psychics" make every year, many are so vaguely worded they are impossible to judge true or false. Others simply involve phenomena that happen every year, such as hurricanes in Florida and continued terrorist activity.

Still other prognostications were not predictions at all, but actually disclosures of movie productions, business ventures, and celebrity activities already under way before 1986 began. While some "psychic" predictions did of course come true (especially those that were not very specific or hard to guess), not one prediction that

was both specific and surprising came true for 1986.

The famous Washington, D.C., "psychic" Jeane Dixon, who claims to have a "gift of prophecy," predicted that famine in Ethiopia and other African nations would be relieved in 1986 when space shuttle astronauts located water beneath barren deserts. She also predicted that shuttle flights would lead to the creation of artificial gems. Her "gift" failed to tell her of the January 1986 Challenger disaster; no shuttles were launched the rest of the year. Dixon also predicted that Princess Diana would announce another pregnancy, that Tom Selleck would lose a valuable automobile when it sank into water, and Madonna would have a baby.

Chicago "psychic" Irene Hughes predicted that severe earthquakes would strike San Francisco in March and Missouri in May, killing hundreds. Princess Diana was to give birth to twins, and an assailant would fire a shot at the pope, but a crucifix around the pontiff's neck would deflect the bullet.

Miami "psychic" Micki Dahne predicted that health problems would force President Reagan to turn over the presidency to George Bush and that vaccines for AIDS and herpes would be developed and distributed to everyone nationwide.

Clarissa Bernhardt, who claims to make accurate predictions of earthquakes, predicted that Old Faithful would dry up. She also foresaw that scientists would accidentally shoot down a UFO with a laser beam and that John McEnroe would retire from tennis to play baseball for the San Francisco Giants.

San Francisco Bay Area "psychics" fared no better. Sylvia Brown predicted that President Reagan would have another bout with cancer around April. The popular TV show "Dynasty" would be canceled, the pope would contract pneumonia, Princess Diana would become pregnant, and the Los Angeles Raiders would face the Bears in the 1986 Superbowl. A power blackout in New York City would last for 16 days, and a strange flu virus causing paralysis of the face would become widespread in February.

Barbara Mousalam, who has in recent years been prognosticating for San Francisco's prestigious Commonwealth Club, predicted that the hostages in Lebanon would be released in 1986 and the Republicans would retain control of the Senate in the November elections.

The Bay Area Skeptics includes scientists, educators, magicians, and others concerned about uncritical public acceptance of paranormal claims.

No Comment Department

PSYCHIC NEWS, a London spiritualist weekly newspaper, recently published a curious report. Their offices had been burglarized, and this was causing problems, the psychics' newspaper said. "A day's mail was stolen—and we have no idea what it contained."

MARTIN GARDNER

Notes of a Fringe-Watcher

Thoughts on Science and Superstrings

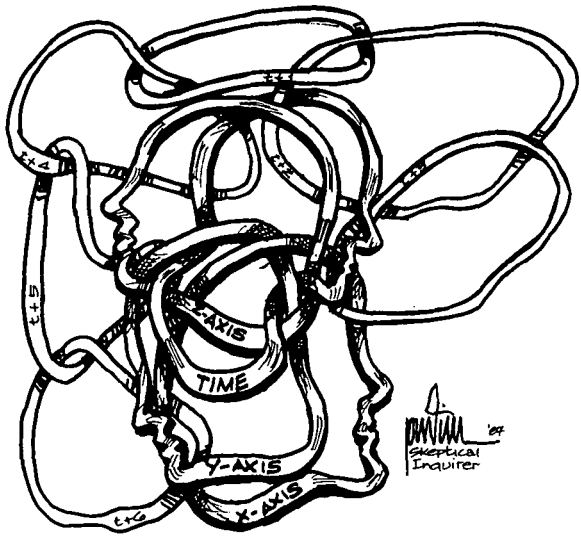
GOADED BY the realization that science is fallible and by the efforts of pragmatists to eliminate "truth" from the vocabularies of science and philosophy, a line of study emerged early this century called the "sociology of knowledge." Its practitioners fall on a rough spectrum. At one end are the sociologists and historians who recognize that science makes steady progress toward understanding how nature works, but who like to stress how that progress is shaped by social influences. At the other extreme are those so smitten by the uncertainty of science that they are almost incapable of making value judgments about the relative merits of competing theories.

Voices from the latter group are perpetually raised about the baleful influence of the "establishment," the keepers of scientific orthodoxy, in opposing offbeat theories that challenge prevailing opinions. It is this group that keeps reminding us, over and over again, about how Aristotelian astronomers fought Galileo's cosmology, how orthodox doctors scorned the germ theory of Ignaz Semmelweis, how conservative geologists ridiculed continental drift, and how stubborn astronomers refused to believe stones could fall from the sky.

One important aspect of the history of science that these extreme sociologists of knowledge tend to overlook is the accelerating speed with which the scientific enterprise is growing and improving its methods and investigative tools. In Galileo's day the number of experiments taking place around the world was minuscule, and the telescope was literally a child's toy. At the time of Semmelweis, medicine was at a stage comparable to astrological astronomy. When Alfred Wegener argued for continental drift, his theory had almost no supporting evidence. Astronomers who did not believe in meteorites knew little about the solar system.

This century's increase in scientific knowledge and techniques has been staggering. Tens of thousands of researchers around the world now make tens of thousands of observations and experiments every year, and report them in hundreds of periodicals. Communication of significant new discoveries is rapid. There are two recent examples: the discovery of the nearest supernova in 383 years, and the creation of materials that superconduct electricity at much higher temperatures than hitherto thought possible. Reports of these dramatic events spread by telephone to laboratories around the world even before they made headlines. Astronomers immediately began observations of the supernova. Physicists instantly began making and testing the new superconducting compounds.

This is not to say that "paradigm shifts" no longer occur, but when they start to occur they are seldom dismissed today by a hostile establishment. The



shifts are increasingly welcome, increasingly rapid, and usually fast roads to fame for the shifters. Moreover, scientific revolutions never totally overturn past dogmas. Relativity and quantum mechanics did not overthrow classical physics; they refined classical physics. The DNA revolution did not overthrow traditional genetics; it advanced traditional genetics. Modern evolutionary theory is not discarding Darwin; it is correcting and improving Darwin's work on the basis of knowledge Darwin could not have had.

At the moment the world of physics is in enormous ferment over a bizarre new conjecture called "superstring theory." Whether it will turn out to be fruitful or just a passing fad may soon be clear, or it may not be clear for decades. In any case, it is a superb instance of how quickly a wild theory, with no empirical support, can capture the enthusiasm of many of the world's most conservative theoretical physicists.

On the last page of my *Ambidextrous Universe* I quoted a famous remark by Niels Bohr. When physicist Wolfgang Pauli had finished lecturing in 1958 on a new conjecture about particles, Bohr arose and said: "We are all agreed your theory is crazy. The question which divides us is whether it is crazy enough to have a chance of being correct. My own feeling is that it is not crazy enough."

Well, the crazy theory is here, and I suspect that if Bohr were around he would be entranced. Edward Witten, a noted Princeton physicist, has described superstring theory as "beautiful, wonderful, majestic—and strange." He thinks the next 50 years will be devoted to work on the theory's implications and possible testing. On the other hand, Sheldon Glashow, who shared a Nobel prize with Steven Weinberg and Abdus Salam for unifying the weak and electromagnetic forces, has jingled:

> Please heed our advice
> That you too are not smitten.
> The book is not finished,
> The last word is not Witten.

Glashow thinks superstring theory has only sociological interest, not for the way some physicists are opposing it, but for how eagerly other physicists are leaping on the bandwagon. Is he right? That's not the point. The point is that within the short span of two years a novel theory has so impressed top particle physicists

that dozens of papers about it are appearing every month, not to mention popular articles like Gary Taubes's cover story, "Everything's Now Tied to Strings," in last November's *Discover*.

To suggest how crazy superstring theory is, let me give a hopelessly inadequate precis of its major ideas. All matter is believed to be made of pointlike particles that belong to two classes: the quarks (of which there are six varieties not counting their antiparticles) and the leptons (also six varieties not counting antiparticles). The most important lepton is the electron. Until now it has been regarded as a geometrical point with no known spatial structure—only quantum properties.

In superstring theory, basic particles are modeled not as points but as inconceivably tiny one-dimensional strings. In the most promising superstring theory, they are closed, like rubber bands. These loops should not be thought of as made of smaller entities, the way elastic bands are made of molecules. They are the quantized aspects of string fields. The infinitesimal loops move, rotate, and vibrate in a space of ten dimensions: one of time, three that are the familiar dimensions of our experience, and six that are "compacted" in the sense that they are curled into invisible hyperspheres at every point in 3-space. When the loops move they follow geodesics that trace minimal surface areas on what is called a "world sheet."

Superstring theory is the latest dramatic instance of how mathematicians construct theorems and formal systems of no known utility that suddenly turn out to have practical applications. Notable past examples include the Greek conic-section curves; Riemann's work on non-Euclidian spaces that became so essential in relativity theory; work on matrices, group theory, and statistics that became part of quantum mechanics; and Boolean algebra that underpins the designing of computer circuitry. In superstring theory it is the work of topologists on two-dimensional surfaces embedded in higher-dimensional spaces. To their vast surprise, topologists now find themselves frantically teaching topology to particle physicists while simultaneously struggling to master quantum mechanics. Weinberg recently speculated that some mathematicians sell their souls to Satan in exchange for information on what new areas of pure mathematics will have profound applications in science!

Are the higher dimensions of superstring theory "real" or are they artificial constructs like the infinitely dimensional Hilbert spaces of quantum mechanics? Physicists are dividing over this question. Some see the compacted dimensions as no more than useful artifacts. Others see them as no less real than 3-space.

A similar debate concerns the reality of superstrings. At this moment, any prediction about the outcome would be foolhardy. Ernst Mach, the Austrian physicist who so strongly influenced Einstein, could not believe that atoms and molecules were anything but mathematical abstractions; useful, yes, but no more "out there" than the curves that represent a functional relationship between two variables are out there. Atoms now have passed from theoretical entities to "observables" that can be seen in microscopes. Superstrings obviously are not like ordinary strings or elastic bands; nevertheless they could model structures as much "out there" as molecules, trees, and stars.

String theory goes back to the late 1960s, when no one took it seriously. It was not until about 1980 that John Schwarz of Caltech and Michael Green of London's Queen Mary College transformed strings into superstrings by combining them with grand unified theories (GUTs) based on the supersymmetry of force fields immediately after the Big Bang and the symmetry breaking that occurred as the superhot universe expanded and cooled. A few years later

Green and Schwarz succeeded in purging superstring theory of the numerous inconsistencies that had plagued it. It was this purging that ignited the current big bang of interest in superstrings.

For the first time, apparently, there is now a plausible, elegant way to account for all the forces of nature as well as for the properties of all the particles, especially the yet-undetected graviton. The graviton belongs to a family of bosons, the so-called "virtual particles" that are the carriers of forces. Other GUTs incorporate gravity, but superstring theory is the first to require gravity as an essential part of the theory. The graviton is the simplest mode of vibration the little loops can have. Without gravity, the strings fall to the ground.

Superstring theory is what some physicists like to call a "TOE," an acronym for "Theory of Everything." Of course it doesn't really explain everything. For one thing it hasn't explained (yet) why the universe, after the primeval fireball, curled up six space dimensions into tight little hyperspheres while the other three, along with time, expanded. And of course it doesn't explain why nature selected equations that describe the behavior of shimmering strings to build a universe, including you and me. Why is there something rather than nothing? And why is that something mathematically structured the way it is? These are metaphysical questions that clearly, at least to me, are in principle beyond the reach of both science and philosophy.

My own opinion is that the Big Bang was a laboratory experiment; that TOE refers to the big toe of a hyperphysicist who used his toe to press the button. •

Martin Gardner's latest books are Knotted Doughnuts and Other Mathematical Entertainments *(W. H. Freeman, 1986),* The Annotated Innocence of Father Brown *(Oxford University Press, 1987), and* The No-Sided Professor *(Prometheus Books, 1987).*

Winnowing Deep Truths from Deep Nonsense

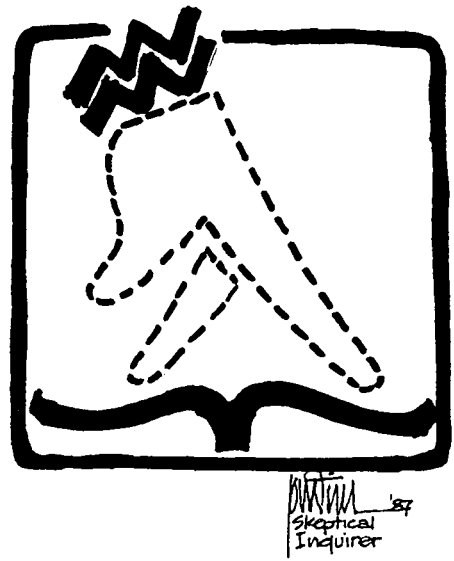
At the heart of science is an essential tension between two seemingly contradictory attitudes—an openness to new ideas, no matter how bizarre or counterintuitive they may be, and the most ruthless skeptical scrutiny of all ideas, old and new. This is how deep truths are winnowed from deep nonsense. Of course, scientists make mistakes in trying to understand the world, but there is a built-in error-correcting mechanism: The collective enterprise of creative thinking *and* skeptical thinking together keeps the field on track.

—Carl Sagan, "The Fine Art of Baloney Detection,"
Parade, February 1, 1987

ROBERT SHEAFFER

Psychic Vibrations

IF YOU'RE looking for the right place to advertise your psychic skills, you might try the *National New Age Yellow Pages,* which is being put together in Fullerton, California. It promises to offer advertising in 140 categories, from acupuncture to Zen. However, last I heard, the publisher was surprised that not one UFO organization had yet taken an ad. (I don't think they *all* could have quietly gone out of business; at least a few of them are still around.) I suspect that most New Age advertisers still rely on old-fangled devices like telephones to take orders, although "real psychics" shouldn't need telephones. Orders could be taken telepathically, and goods shipped telekinetically. *That* should separate the sheep from the goats!



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Veteran observers of the UFO field are scratching their heads trying to figure out why the Atlantic Monthly Press thinks it has a potential blockbuster in *Light Years: An Investigation into the Extraterrestrial Experiences of Eduard Meier,* by Gary Kinder. Meier's tired old claims and alleged UFO photos are nothing new; he has claimed for years to have had repeated contacts with space aliens from the Pleiades. Meier's yarn, and his photos, were written up in *UFO Report* by Lt. Col. Wendelle C. Stevens (USAF, Retired) as long ago as May 1978 and quickly became controversial. A slick book containing many pretty pictures but very little text, titled *UFO . . . Contact from the Pleiades,* was published in 1979 by an organization in Phoenix called Genesis III Productions. However, only the contactee fringe of UFOlogy found it convincing.

Meier claims a long history of UFO and telepathic experiences, beginning at age four. (See *SI,* Summer 1980, p. 15; Fall 1980, p. 74.) Even most UFO proponents considered Meier's photos sophisticated hoaxes. He has published many unconvincing photos of alleged spaceships, but none of his Pleiadean friends. In 1981, UFOlogist Kal K. Korff, who is certainly no skeptic, wrote a book titled *The Meier Incident: The Most Infamous Hoax in UFOlogy.* According to Korff, "approximately half the book's contents were fabricated by publishers

and promoters." When Korff's book was reviewed in *Fate* magazine, associate editor Jerome Clark, who is *certainly* no skeptic, did not disagree that Meier's claims were bogus, but questioned only whether some other UFO hoax might not be more "infamous." As if this were not bad enough, astronomers tell us that a young star cluster like the Pleiades is one of the *worst* places to look for intelligent life, for the stars in it are newly formed and have not even had time for any planets to cool or solidify, let alone evolve advanced life-forms. Wendelle Stevens, one of Meier's biggest boosters, went on to write other exciting UFO books, including *UFO Contact from Reticulum, UFO Contact from Undersea,* and *UFO Contact from Planet Igara.* This time around, Stevens will be able to provide at best limited assistance in promoting Meier's claims, because he is now in prison.

The Atlantic Monthly Press certainly has high hopes for *Light Years,* which has reportedly been selected as its "lead nonfiction title." Fifty thousand copies have been run in the first printing, and $50,000 was set aside for promotion. Author Kinder was planning a 22-city promotional tour. His agent, Richard Pine, says, "It looks like *Light Years* is destined to fly as high as Meier's Pleiadean friends," which, judging by what we've seen of Meier's "evidence" these past nine years, could leave the book belly-up in the sand.

* * * * *

If you have ever wondered what causes some of the wild gyrations in the stock market we've seen lately, don't overlook the planets. So says Arch Crawford, publisher of the *Crawford Perspectives* newsletter. According to a story in the *St. Petersburg Times,* a nosedive of the market on January 23 was because of the respective alignments of Mercury with Pluto, and Mars with Mercury. "The only

other time we have ever seen the *Wall Street Journal* say 'analysts could find no reason for the decline' was on a 21-point down day following an eclipse of the moon," Crawford said. "Must they stay blind?" He theorizes that "cycles, lunar phases, atmospheric ionization, sunspots, and planetary phenomena" affect the brains of those trading stocks. He warned investors to be on the alert from February 8 to 13 this year, when Jupiter would allegedly line up with Uranus and Pluto and there would be a full moon. He expected the stock market to take a significant turn, and probably for the worse. Actually, stock prices changed very little during the week of February 8 to 13, with the market averages closing on February 13 well above the levels of January 23.

* * * * *

What travels faster than a speeding light beam? Do you say "Nothing," you closed-minded skeptic? Well, those space aliens might be doing just that, according

to Jimmy Ward and William L. Moore of the Fair Witness Project, a group that investigates alleged flying-saucer crashes and other mysterious stuff. Moore, co-author with Charles Berlitz of *The Roswell Incident,* is a dogged pursuer of smashed-up saucers and other alleged CIA coverups.

Einstein has been generally misunderstood, they say, claiming that the noted Fortean monster-chaser Ivan T. Sanderson once recorded a conversation with Einstein in which the great physicist denied he ever ruled out faster-than-light travel—in fact, he allegedly said that his theories *proved* otherwise! They draw upon a hidden "key" to understanding relativity found in the introduction of Einstein's *The Meaning of Relativity,* which has previously remained hidden to everyone but themselves "only because so few experts ever read an introduction all the way through." (Experts, apparently, always jump right past the introductions of books to get to the meaty parts that much faster.) The "key" has something to do with an analogy of how a one-eyed theologian would view a three-dimensional world. From this they deduce that an alien spacecraft that has somehow managed to reach the speed of light would be observed as a moving black hole, that is to say, it would not be seen. However, it would be releasing a tremendous amount of energy of some unspecified kind.

Delving further into advanced astrophysical concepts, Ward and Moore take note of "streams of matter" apparently ejected from quasars, many of which seem to be pointing in our direction. "Could these 'streams of matter' be spaceships traveling faster than the speed of light toward us? Such 'ridiculous' questions tend to make orthodox scientists nervous." Perhaps we now know why Moore's celebrated flying-saucer crashes might have occurred: Saucer crews, traveling faster than light, couldn't see where they were going! •

The Persistence of Bamboozle

One of the saddest lessons of history is this: If we've been bamboozled long enough, we tend to reject any evidence of the bamboozle. We're no longer interested in finding out the truth. The bamboozle has captured us. It is simply too painful to acknowledge—even to ourselves—that we've been so credulous. (So the old bamboozles tend to persist as the new bamboozles rise.)

—Carl Sagan, "The Fine Art of Baloney Detection,"
Parade, February 1, 1987

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Forum

The Cold Reading of Writing

MANY OF US associated in one way or another with CSICOP end up becoming self-appointed gadflies vis-à-vis local media coverage of the paranormal. We spend far too much of our time writing letters to the editor and calling local radio and television stations. It is fairly common, once one has attained the vaunted position of "local skeptic" through such letters and calls, to receive mail and even phone calls from some very well-meaning people—as well as from some seriously disturbed folks—hoping to set us straight about some particular belief of theirs we have questioned. My experience with handwriting analysis came about as a result of one of these occurrences.

I had written a letter to the Sunday magazine editor of my local newspaper, the *Hartford Courant,* concerning an advertisement that had appeared in a previous issue. Although fairly clearly labeled as an advertisement, it was also pretty clearly masquerading as a magazine article. This ad consisted of a two-page narrative, with a title and an author, extolling the virtues of handwriting analysis. According to the ad/article, your handwriting "will tell an expert things that your best friend or mate wouldn't know after a full ten years," "shed light on 'real life' mysteries," and maybe even "actually foresee the future."

At the end of the ad, there was a blank box where the reader was invited to place a sample of his or her own handwriting and submit it to a Dr. Pedregal, who would analyze it for a mere $12 (plus a $2 postage-and-handling fee). Of course in my letter to the editor I pointed out that you were requested to indicate on the form your age, sex, and *handedness!* This guy claims to be able to delve into your deepest self and foretell your future based on how you cross your "t's" and dot your "i's," but he needs *you* to tell *him* your age, sex, and whether you are right- or left-handed. Can't he tell?

In any event, a couple of days after my letter was published, I received a phone call from a woman thanking me for writing the letter and, at the same time, assuring me that graphology was a valid way of analyzing one's personality. She even offered to analyze my handwriting gratis. I jumped at the chance and quickly sent her a sample.

Interestingly, but in retrospect not at all surprisingly, she insisted on giving me the results of her analysis over the phone rather than in writing. Her handwriting analysis was to be, quite simply, a "cold reading," where, consciously or not, she would rely on my immediate responses to her statements to refine her reading of my personality. (See Ray Hyman's article on cold reading in *SI,* Spring/Summer 1977, and James Randi's in *SI,* Summer 1979.) In other words, her reading of my personality was not really to be based on my handwriting (any more than a reading

GRAPHOANALYSIS
- witty, sensitive, shy
- shy, sensitive, witty
- funny, introverted, shy
- introverted, humorous, shy
- sensitive, humorous, shy
- clever, introverted, shy
- clever, touchy, shy
- retiring, funny, touchy, * (or none of the above)
Skeptical Inquirer

by an astrologer is really based on a horoscope or a reading by a "psychic" is based on ESP). It was to be based on a sort of instant psychoanalysis of me as we spoke (thus the phone call instead of a written report of my handwriting). If it went well for her, I would be amazed at the accuracy of her account. I would not be expected to notice that this accuracy, in reality, consisted of trivial generalities and relied on my own subconscious acquiescence in the reading. She would be right on the mark because I would become an unaware co-conspirator in the reading. Needless to say, I did not cooperate.

She started by saying that, before she began the actual analysis, she wanted to see if her "vibes" were correct. "I assume you are not married." My wife of more than five years was downstairs at the time attending to our four-month-old baby. So much for her vibes. Though surprised at being wrong, she went on, undaunted. What followed was a perfect example of a cold reading.

She said she would do all the talking and that I could comment on her analysis when she was finished, but this was not what happened. She continually stopped and asked how she was doing and requested me to provide feedback. Consciously or not, she did what most good cold-readers do: She said things that were very flattering—I was highly intelligent, sensuous, and artistic. She made statements that were absolutely correct because they could not have been wrong about anybody: She said I was inhibited in some areas and uninhibited in others; outgoing, but I don't always let people get close to me; I had a secretive side to me. I enjoyed music, art, acting. She called me analytical. I was impulsive, but I often hold back. I have highs and lows, she said.

I did not want to be rude, but neither did I want to help. After all, she was supposed to be analyzing my handwriting. Each time she asked about her accuracy, I simply put her off. She then would throw in a little more information about me. When that didn't work, she began to go into more detail than I really wanted to hear about *herself.* For a while I wondered who was being analyzed. She told me about her physical ailments, her personality, movies she had seen, her love life, and so on.

Eventually she did get down to sort of specific statements about me. She was pretty consistently wrong, and I told her so. She said my mother was the most significant influence in my life. I told her that everyone who knows me and my family swears that I am exactly like my father. She responded, "That may be what people have told you, but the way you write the pronoun 'I' indicates much stronger mother influence." She was not terribly pleased when I maintained that I hold the opinions of people who know me in higher regard than I do an analysis of how I write the capital letter "I."

I believe I frustrated the woman and even made her feel a bit uncomfortable. I simply refused to cooperate (but even then I was giving her information; clearly I was being rational and logical about her attempt, so midway through her analysis she described me as being logical). I told her when she was simply wrong. I also pointed out the meaningless generalities she was presenting: She said I get down in the dumps sometimes. I responded, "Who doesn't?" She replied:

"You're being unfair. Some people don't." Right!

After a while—I think when she sensed that I simply was not going to give her the information she needed for an accurate analysis—she gave up talking about me completely and focused on the details of her life and work. She certainly seemed to be an interesting, sincere person. She believes in what she is doing, but clearly there is nothing to it.

I think I was a disappointment to her. She promised to send me an outline of her analysis of my handwriting and copies of some articles about her work. She said it might take a week or so, but it has been a few months and I am still waiting. I wonder if her handwriting shows that she is not punctual. Well, anyway, I am sure it shows that she is a very nice woman, though not particularly scientific.

—Kenneth L. Feder

Kenneth L. Feder is in the Department of Anthropology at Central Connecticut State University. He is a SKEPTICAL INQUIRER consulting editor.

Out-of-Body Travel and Other New Age Wonders

THE VOICE on the phone was unfamiliar. The invitation caught me by surprise: "Would you like to debate me at my new Rainbow Centre on our Gala Opening weekend?" It was Dr. Christopher Holmes, the former York University (Toronto) psychology professor, whose controversial dismissal from that center of learning had been highly publicized. Three years earlier he had lost tenure, according to the university, because of his mystical teachings in psychology classes.

According to Holmes, the real reason he was dismissed was for teaching a course on the occult. He contested his dismissal on the grounds that he was being denied academic freedom by narrow-minded colleagues who knew nothing of his work. After three years of delays in settling the case, Holmes finally accepted a cash settlement of $95,000 from the university, plus being allowed to teach a course in mystical studies part-time.

Holmes has used some of his money to set up the Rainbow Centre, "a new age educational and entertainment center featuring Hidden Mysteries . . . specializing in mystical, spiritual, occult, psychic and health care literature, crafts, posters, music and artifacts." The Centre will explore Theosophy, the philosophies of Gurdjieff, Ouspensky, and others, and will feature guest lecturers on mysticism, cosmology, the New Physics, reincarnation, and so on.

Holmes was asking me, a skeptic and debunker, to take part in a debate during the opening festivities. Would miracles never cease? How could I refuse in the face of such moral courage and objectivity.

So, one Sunday evening I found myself sharing a platform with Chris Holmes and John Lattanzio, a member of the Ontario Skeptics, who had been graciously accepted by Holmes as the debate moderator. I was facing a fairly hostile and wary-looking audience. That's all right, I thought, as long as they don't advance toward me.

The title of the debate was "Are Psychics Really Frauds?" I thought it would be a good idea to open by defining the term *psychic,* which I described as a

person who claims extrasensory powers, reads minds, predicts future events, is clairvoyant, controls inanimate objects with the mind, and performs all sorts of miraculous and otherworldly feats. But Dr. Holmes didn't see it quite that way. To him, everyone is psychic and can be tuned in to a higher state of awareness.

The debate soon took off in all directions. This didn't bother me too much, because it was quite interesting and the audience became involved. I had originally planned to detail the vast number of psychics who had been exposed as frauds, but this plan now went out the window.

Holmes committed what I thought was an error at the outset when, in attacking the scientists associated with the Committee for the Scientific Investigation of Claims of the Paranormal, he pronounced them all pseudoscientists. This would place Isaac Asimov, Carl Sagan, Stephen Jay Gould, Evry Schatzman, Murray Gell-Mann, Francis Crick, and others of their caliber in that category.

The problem that continually surfaces in an argument between a scientific-minded skeptic and an occult-minded believer in the abstractions of mysticism is that the believer will not accept scientific evidence as evidence. So we end up debating apples and oranges.

No matter what science proves, it means nothing, according to Holmes, because scientists are pursuing truth the wrong way. He turns this around by saying, "Unless we attain self-knowledge and realize these things ourselves, no amount of outside evidence would ever convince a person. . . . Because scientists don't have the personal experience, no matter what the evidence is they won't accept it as evidence." The only true scientist, according to Holmes, is the one who has seen the light through the teachings of the mystics.

There is "vast evidence" of the paranormal that needs serious investigation, he said. No argument on that point. The only problem is that this "vast evidence"

is anecdotal. It fills literally thousands of volumes—but large numbers don't necessarily denote truth. And, as I tried to point out, the closest we can get to the truth is through the proven methods of science—not by trying to trace hearsay stories or track down ancient myths. Apples and oranges again.

Holmes claimed that when a psychic holds an object belonging to a person, he or she can "tell things" about that person. This is known in the psychic trade as "psychometry." Strange that Randi's $10,000 hasn't yet been snapped up by a psychometrist.

Astral projection, or out-of-body experiences, are endorsed by Holmes as quite authentic and within anyone's capability. I pointed out that psychologists who have studied this phenomenon have come up with natural explanations for this transcendental state. Experiments with drugs have produced this effect, they claim.

But to say that someone can actually travel from place to place bodyless strains credulity a little. Although, as Woody Allen once wrote, "This is not a bad way to travel, although there is usually a half-hour wait for luggage." Woody cited the case, anecdotal of course, of Sir Arthur Nurney, "who vanished with an

audible 'pop' while he was taking a bath and suddenly appeared in the string section of the Vienna Symphony Orchestra. He stayed on as the first violinist for 27 years, although he could only play 'Three Blind Mice,' and vanished abruptly one day during Mozart's Jupiter Symphony, turning up in bed with Winston Churchill."

I suppose this case is just as authentic as the well-known story of Uri Geller, who once lay down on a couch in front of five witnesses, and, when he finally got up, announced that he had just been to Rio de Janeiro and had been walking along Copacabana Beach. He proved it by pouring the sand out of his shoe.

Chris Holmes testified to the fact that he has had several psychic experiences himself. I have found, over the years, that most people who have a belief in the occult *have* had these experiences. Indeed, almost everyone has encountered some strange happening at one time or another and been unable to explain it. The strong believer will label the experience "paranormal." The more rational-thinking individual will usually seek a natural explanation.

The debate wound up with questions from the audience. Most of the questions, and statements, revealed the mindset of the attendees. One person commented, "I feel that all psychic phenomena belong to the realm of prenatal experience from the moment of the cell and its evolution. . . . I feel that a newborn baby is a total psychic." A voice from the rear called out, "Is the sperm psychic?" The answer, "Yes."

I later discovered that this last questioner was Scott Hoffmann, another member of the Ontario Skeptics group.

I see no harm in Christopher Holmes's conducting another course on the occult at York University—providing either he or someone else gives the students the opportunity to see the other side of the coin.

—*Henry Gordon*

Henry Gordon is a Toronto magician, lecturer, writer, and broadcaster. He is chairman of the newly formed Ontario Skeptics.

Subliminal Influence

A MANUFACTURER of subliminal broadcasting equipment is now presenting its story to schools and hospitals. Its apparent success in reducing theft in retail stores has given the company confidence that its technology can be helpful in other settings. I heard the presentation at a local medical center.

The company president is a bright young man with a master's degree in psychology. He has a powerful high-tech parent company and an impressive board of directors. The professionally polished slide program is supplemented with an extensive bibliography on subliminal research to impress the academicians.

Here is the intersection of technology and psychological research. The message generator is a tamper-proof chip, and each signal is modulated according to background noise. This is not a fly-by-night company. Moral, ethical, and legal issues were openly discussed. For example: Is it ethical to beam covert messages to customers and employees without their knowledge? The company will not broadcast advertising; its goal is to reinforce honesty. Use of its services by schools and hospitals would be a logical extension that would reduce the appearance of a business bias.

The presentation made believers out

of skeptics because the methods used are based on the best from decades of research. The data on the reduction of theft is remarkable. These systems pay for themselves, and the companies who use them know they work. Using the same techniques, let's get started in recovery rooms and rehabilitation units where we can alleviate human suffering. I have a folder full of studies that show ways to help patients speed their recovery, reduce postoperative pain, and shorten hospital stays. It can be done with nursing attention, better anesthesiologist participation, relaxation training, and patient education. I would be reluctant to suggest this personal attention be replaced by a chip on the ceiling. Nevertheless, I believe *initial* research results would show patient response precisely because a chip on the ceiling would be an exciting event, creating unintended changes in personnel.

Slowly I rouse myself from the intoxicating presentation. History tells me we have traveled this path before. What evidence is needed to be confident that the subliminal stimuli are responsible for the change? The Hawthorne Effect is one of psychology's oldest lessons: Variables introduced to increase performance may not be the cause of subsequent change. Have we thrown out this psychological baby now that high-tech bathwater is available?

The company denied extraneous influences in its anti-theft program. The equipment was placed without the knowledge of employees. A perfect before-and-after study showed reduced theft. But I can think of several complications and leaks. Assume, for example, that the store manager has been concerned about employee theft. Suddenly he stops talking about his concern, which causes a rumor that he hired a "snitch." Management is so pleased when the theft goes down that they change their attitude toward the workers, which in turn keeps theft down thereafter.

I asked why a subliminal message would be more powerful than an audible message. What if, for example, they played a message every half-hour that said, "Hello, shoppers. Bargain Rags Clothing is pleased to report the lowest shoplifting rate in the city, which allows us to pass on savings to you."

The question was received less graciously than questions about moral responsibility. They challenged me, instead, to do a study that would answer these questions. I'm busy on my own research (on fraud), but I volunteered to be a design consultant on their future projects. The director of research for the firm did not ask for my number, and she has not written. After all, a tape-recorder and a loudspeaker are low-tech and cheap.

—Loren Pankratz

Loren Pankratz is a psychologist with Psychology Service at the Veterans Administration Medical Center in Portland, Oregon.

Incredible Cremations: Investigating Spontaneous Combustion Deaths

Investigation of cases of alleged spontaneous human combustion finds explanatory circumstances.

Joe Nickell and John F. Fischer

HAVING SEEMINGLY struck intermittently over the centuries, the specter of "spontaneous human combustion" appeared to have claimed yet another victim in St. Petersburg, Florida, one morning in mid-1951. On July 2, a Monday, at eight o'clock, the landlady of a four-unit apartment building on Cherry Street attempted to deliver a tenant's telegram, for which she had just signed. As she walked to the apartment of the tenant, Mrs. Mary Reeser, and attempted to open a hall door, she found the knob too hot to grasp. Her cries for help summoned two house painters who ran over from across the street.

Advancing through the smoke-filled hallway into the 67-year-old widow's efficiency apartment, the men came upon the evidence of a gruesome mystery. It was to become *the* case in the annals of the alleged phenomenon known as "spontaneous human combustion" (SHC)—a case that demanded answers to many questions: What was the nature of a fire that had no apparent cause, that could leave a room relatively undamaged yet so completely consume the body of a large woman that there remained little more than ashes, a slippered foot, and an eerie shrunken skull? Might proponents be correct in suggesting that SHC is related to "geomagnetic fluctuations" (Arnold 1981) or to man's "electrodynamic being" (Gaddis 1967)?

Joe Nickell teaches technical writing at the University of Kentucky. Formerly a stage magician and a private detective, Nickell has written investigative articles for many magazines and journals. An updated edition of his Inquest on the Shroud of Turin *will be released by Prometheus Books later this year. John F. Fischer is a forensic analyst with the crime laboratory of the Orange County Sheriff's Office, Orlando, Florida. An experienced crime-scene investigator, Fischer is also president of a corporation specializing in forensic research, especially in the field of laser technology.*

The gruesome remains of Dr. J. Irving Bentley, whose death in Pennsylvania in 1966 is frequently attributed to "SHC." Actually, the 92-year-old pipe-smoking physician frequently dropped ashes on his clothes—as burns on the bedroom rug indicated he had done a final time. He made his way with his walker to the bathroom in a vain attempt to extinguish the flames. The fact that he shed his robe, found smoldering in the bathtub, *demonstrates an external rather* than internal source of ignition.

To answer such questions we launched a two-year investigation that focused on Mrs. Reeser's death but began with a historical overview of the alleged phenomenon. Our lengthy two-part report was published in the journal of the International Association of Arson Investigators (Nickell and Fischer 1984).

We found that a widely publicized mid-nineteenth-century debate over the supposed phenomenon is typical of the continuing controversy. That debate was sparked (so to speak) by Charles Dickens's novel *Bleak House,* wherein a sinister, drunken Mr. Krook perished by "spontaneous combustion." George Henry Lewes, the philosopher and critic, had publicly accused Dickens of perpetuating a vulgar superstition. Lewes (1861) insisted that such a death was a scientific impossibility, a view shared by the German chemist Justus von Liebig, who wrote: "The opinion that a man can burn of himself is not founded on a knowledge of the circumstances of the death, but on the reverse of knowledge—on complete ignorance of all the causes or conditions which preceded the accident and caused it" (Liebig 1851).

Thus rationalists like Lewes were seizing the scientific high ground with the question of *cause:* Dickens, on the other hand, was arguing primarily from *effect:* He cited several cases of the alleged phenomenon, some of which had been attested to by medical men of the time. To assess these contrary views we began by researching a number of seemingly representative

cases that spanned more than two and a half centuries.

One of the earliest cases took place in February 1725 at Rheims. The burned remains of a Madame Millet were found on her kitchen floor, a portion of which had also burned. Although her husband was subsequently convicted of murdering her, a higher court reversed the decision, attributing the death to spontaneous combustion. Actually, the woman was one who "got intoxicated every day," had gone to the kitchen "to warm herself," and was discovered only "a foot and a half's distance" from the hearth. Therefore, Thomas Stevenson (1883), in his treatise on medical jurisprudence, suggested her clothes had "accidentally ignited."

In contrast to this was another early case, the 1731 death of the Countess Bandi of Cesena, Italy, aged 62, who was *not* given to intoxication. Although her body was supposedly reduced to "a heap of ashes," part of her head remained, and her legs and arms were not burned. The ashes contained "a greasy and stinking moisture," soot floated in the air, and from the window there "trickled down a greasy, loathsome, yellowish liquor with an unusual stink." However, this case—which served as one of Dickens's sources—seems quite explicable when further data are added: On the floor was an empty, ash-covered lamp on which the countess had apparently fallen, its burning oil no doubt aiding in the immolation.

At least three other eighteenth-century cases involved women who drank: Grace Pett of Ipswich, who perished in 1744, her burned remains attended by a fatty stain and lying near both a fireplace and a fallen candle; a Frenchwoman, Madame De Boiseon, aged 80 in 1749, who supposedly "drank nothing but spirits for several years," whose body was still burning in a chair placed "before the fire"; and, sometime prior to 1774, 52-year-old Mary Clues of Coventry, who was "much given to drinking" and whose death a medical investigator attributed to her shift having caught fire, either from "the candle on the chair or a coal falling from the grate."

Sometime before 1835 (when Theodric and John Beck published the case in their *Elements of Medical Jurisprudence*), an intoxicated 30-year-old Hannah Bradshaw burned to death in New York. A four-foot hole had burned through the floor of her room, and her bones and a burned-off foot were found on the ground underneath. Significantly, a candlestick, with a portion of a candle in it, was found near the edge of the hole.

Other nineteenth-century cases include the 1852 death of John Anderson, a wood hauler and "notorious dram drinker," who was seen to get down from his cart, stumble, and burn to death. His body was only *charred,* which is consistent with his clothes having caught fire and with there being no additional fuel source. Anderson's lighted pipe was found under his body.

In 1870, in France, the body of a drunken woman was found on her bedroom floor, which was still smoldering. There was considerable damage to the torso, with a "greasy black soot adhering to the vertebrae." Although there was supposedly "no fire in the grate"—at least none remaining—the body nevertheless lay partially *across the hearth;* the drunken woman may have set her clothes ablaze while attempting to light the fire.

After the turn of the century, in 1908, a retired English schoolmarm named Wilhelmina Dewar was found dead. Her body was burned, but the bed on which it was lying remained unscorched. Under questioning at the inquest, her sister admitted that she had actually discovered Wilhelmina "burned, but still alive" and that she had "helped her walk to the bed, where she had died."

From the cases above (typical of the 30 we researched) some patterns emerged. For example, there did seem to be some correlation between drunkenness and supposed instances of SHC. Early theorists, including members of the temperance movement, had suggested that alcohol-impregnated tissues were rendered highly combustible, but scientists refuted the notion by experimentation and pointed out that a person would die of alcohol poisoning long before imbibing enough alcohol to have even a slight effect on the body's flammability. We determined instead that the correlation was most likely due to heavy drinkers' being more careless with fire and less able to properly respond to accidents.

We also found an even more significant correlation: In those instances where the destruction of the body was relatively minimal, the only significant fuel source seems to have been the individual's clothes, but where the destruction was considerable, additional fuel sources—chair stuffing, wooden flooring, floor coverings, and so on—augmented the combustion. Such materials under the body appear also to have helped retain melted fat that flowed from the body and then volatilized and burned, destroying more of the body and yielding still more liquefied fat to continue the process known as "the candle effect." (Stevenson explained that in one case a hempen mat had become so combustible because of "the melted human fat with which it was impregnated" that it "burnt like a link"—i.e., like a pitch torch.)

Such correlation of the amount of destruction with the utilization of available fuel sources makes a forceful argument against the notion of "preternatural combustibility." And the presence of plausible sources of the ignition—proximate candles, lamps, fireplaces—makes the postulation of "spontaneous human combustion" completely unwarranted.

Proponents of SHC argue that bodies are difficult to burn because of the great amount of water they contain, but the water is boiled off ahead of the advancing fire. Again, they argue from comparisons to the destructive force of crematories, asserting for instance that a temperature of 2,500° Fahrenheit or more is required to destroy a body in three hours (Allen 1951). Actually, an authoritative forensic source states that a period of only one and a half hours at 1,600° to 1,800° is required (Spitz and Fisher 1980). In any case, if a longer time is involved, a lower temperature would be sufficient. As D. J. X. Halliday of the Fire Investigation Unit of London's Metropolitan Police Forensic Science Laboratory explains, "Cremation is intended to destroy a body in the shortest possible time and is therefore carried out under extreme conditions, but a relatively small fire can consume flesh and calcine bone if it is allowed to burn for a long time" (Halliday 1986). Many hours were typically involved in the cases of extensive destruction that we researched.

But what of a case in which there was no known cause for the ignition, the body was almost completely destroyed—except for a foot and a "shrunken skull"—and yet the surroundings were relatively undamaged? That is the way the celebrated "cinder woman mystery"—"probably the best-documented modern case" of SHC (Gadd 1981)—is sometimes portrayed. But our reinvestigation of that case—which involved our obtaining the police report, the death certificate, and contemporary news accounts—provides a lesson in the need for treating instances of alleged SHC on a case-by-case basis.

For example, one account (Gadd 1981) neglects to include some essential facts: When last seen, Mary Reeser was wearing a flammable nightdress and housecoat, sitting in the overstuffed chair in which she subsequently died, and smoking a cigarette. Also omitted was the fact that earlier that day she had told her son, a physician, that she had taken two sleeping pills and intended to take two more before retiring (Allen 1951).

Other accounts concede that Mrs. Reeser may have indeed died as a result of dropping her cigarette as she dozed off and that SHC may not have been the cause, but they postulate a related phenomenon termed "preternatural combustibility." For example, Vincent Gaddis scoffs: "That flames from a nightgown, housecoat, and a chair that doesn't flare up but smolders, could create sufficient heat to cremate a large human body is ridiculous. And the notion that fluid-saturated fatty tissues, ignited by an outside flame, will burn and produce enough heat to destroy the rest of the body is nonsense" (Gaddis 1967).

Gaddis was reacting to the conclusion stated in the official police report (the text of which is given in Blizin 1951) that "once the body became ignited, almost complete destruction occurred from the destruction of its own fatty tissues." In fact, we learned that Mrs. Reeser was a "plump" woman and that a quantity of "grease" —obviously residue from her body—was left at the spot where the chair had stood.

As to Gaddis's insistence that the chair would not burn, Thomas J. Ohlemiller—an expert in smoldering combustion at the Center for Fire Research, Department of Commerce—told us: "Fire deaths caused by cigarette ignition of bedding and upholstery are among the most common in the U.S. . . . The smoldering spreads slowly and can sometimes consume the entire piece of furniture with no flames." Ohlemiller added, "More commonly the smoldering process abruptly ignites the gases coming from the object; this may occur an hour or more after the smoldering process was initiated" (Ohlemiller 1982).

In the Reeser case, what probably happened was that the chair's stuffing burned slowly, fueled by the melted body fat and aided by partially open windows. From the time the widow was last seen sitting in the chair until her remains were discovered, almost 12 hours had elapsed.

Gaddis had further questioned why, if the fatty tissue had indeed burned, it did not spread the fire. The answer is that the fire did spread more than some accounts acknowledge: An adjacent end table and lamp were destroyed and a ceiling beam had to be extinguished when firemen arrived. Besides, the

melted fat would have been slowly absorbed by the chair's stuffing, and in any event the floor was of concrete.

That one of the widow's feet remained intact may have been due to the fact that Mrs. Reeser had a stiff leg, which she extended when sitting. Or, as the burning chair collapsed and the body rolled out onto its right side, the foot reached beyond the radius of the fire.

One of the strangest and most frequently reported elements of the case—the alleged shrinking of the skull—probably never happened. The self-styled "bone detective" who is often quoted on the subject merely referred to second-hand news accounts and thus spoke of "a roundish object identified as the head" (Krogman 1953). Actually, as a forensic anthropologist theorized at our request, Mrs. Reeser's skull probably burst in the fire and was destroyed, and the "roundish object" could have been merely "a globular lump that can result from the musculature of the neck where it attaches to the base of the skull" (Wolf 1983).

In conclusion, what has been described as "probably the best-documented case" of alleged spontaneous human combustion is actually attributable to the deadly combination of a lit cigarette, flammable nightclothes, and sleeping pills. And the notion of preternatural combustibility must yield to the evidence supporting the "candle effect"—in which a body's fat liquefies and thus participates in its own destruction.

However, although even a lean body contains a significant amount of fat, other factors may be involved in a given instance. We therefore urge investigation of cases on their own evidence. The operative word is *investigation,* not merely debunking—although the former may surely result in the latter in instances of allegedly spontaneous human combustion.

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Subliminal Deception: Pseudoscience On the College Lecture Circuit

The belief that advertisements contain hidden sexual and demonic images is widely held—even though no evidence exists that such images are used or that they would be effective if they were.

Thomas L. Creed

WE TEND to believe what we are told. When we hear a lecture by a purported expert who is also a dynamic and persuasive speaker, we are likely to accept his or her theory as true. Currently, students on many college campuses are being treated to a very effective speaker indeed —Wilson Bryan Key.

In his lectures, Key summarizes the theories he has presented in his three popular books: *Subliminal Seduction* (1973), *Media Sexploitation* (1976), and *The Clam-Plate Orgy* (1980). In these books and in his frequent lectures to college audiences, Key repeats the following argument:

1. Advertising is probably the most potent force in our lives.

2. Advertising is so potent because virtually all advertisers manipulate an unwary public by using hidden images and words that evoke strong emotional responses.

3. The techniques used are so powerful because: (*a*) they appeal to repressed sexual taboos in our society, and (*b*) they work at an "unconscious" level, where the brain "works at the speed of light" and instantly recognizes and assimilates the taboo material.

In his books and lectures, Key generally presents a few simple experiments and some simplistic theorizing interspersed in a litany of the "subliminally"[1]

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embedded images and words he contends have been placed in various advertisements. He sees hidden images in a wide variety of advertising, but the bulk of his examples are from liquor ads. He finds, especially within the vague patterns and shadings of ice cubes, many phalluses, vaginas, skulls, demonic faces, obscene words, and so on. And it is not just advertisers who are using hidden messages; Key believes a conspiracy exists among widely diverse elements of society to subtly manipulate the public. For example, he claims that the word *sex* has been subliminally written into Abraham Lincoln's beard on five-dollar bills.

Before analyzing Key's thesis, one must ask whether it warrants concern. Since his lectures entertain students for a couple of hours and his books are amusing, what's the harm? The harm is that he has a large, mostly believing audience, and those who accept his false thesis are left with a distorted, oversimplistic view of society, perception, and science in general. His claims need to be addressed.

The Audience

After I attended a lecture of Key's in October 1986, a large sample of students (about 200) were informally interviewed to assess the extent to which they had believed him. While several of the upper-division students had found his theory flawed, it was clear he had successfully convinced most students of his thesis.

Key gives about 40 lectures a year on college campuses. My college has an enrollment of a little under 4,000 students. He drew an audience of approximately 700, the largest attendance for any lecture in the past couple of years. Assuming most colleges are slightly larger, he is probably averaging around 800 to 1,000 students at each lecture. If 75 to 85 percent of the audience is accepting Key's thesis, which seems a reasonable guess after what I observed, then as many as 25,000 to 30,000 students a year are being influenced by him. If you add to this number the millions who have read his books, his audience is enormous. Few scientists have an audience as large.

The Fallacy of the Thesis

That advertising is a potent force in our lives is hardly a novel claim. What is novel about Key's thesis is *why* advertising is effective. He has his own unique theory of how we acquire information. He states repeatedly in his lectures and books that the brain perceives and comprehends the entirety of a complex stimulus, from all perspectives, "at the speed of light." At one point in his lecture, he said that it "took less than a millisecond" for all aspects of a complex advertisement to be perceived, analyzed, and comprehended by the "unconscious brain." This simply does not square with what is known about basic brain functioning. It is a bold statement that contradicts basic concepts of neurophysiology, yet he offered no data to support it (nor does he in his books). He merely kept repeating the statement, assuming it must be true

because it is necessary for his thesis.

Key also provides no support for his belief that stimuli appealing to sexual taboos and death symbols are particularly potent in affecting behavior. Again, he merely assumes that it must be true because it is necessary for his thesis.

Key's attempt to demonstrate the widespread use of hidden sexual images is likewise inadequate. He provides no systematic evidence to support his claim, merely anecdote after anecdote, such as:

> Looking through a collection of pictures with the anamorphoscope, by chance I picked up the Signet paperback edition of *Subliminal Seduction* [see Figure 1]. I casually placed the mirrored tube just above the lemon-peel twist in the middle of the glass.
>
> A very distinct man's face with a cap on his head appeared in the reflection [see Figure 2]. The murky shadows in the bottom of the martini were anamorphic distortions of the face. However, cylindrical anamorphosis cannot be read in its undistorted form without a special instrument. To work as a sales stimulus —in order for the significant investment of talent, time, and money to be justified—the brain must have an ability to perceive and decode the picture, even though at a nonconscious level of perception. [Key 1980, pp. 177-178]

While Key calls the face "distinct," it looks like an ambiguous stimulus to me. I showed this picture to a couple of dozen people, asking them what they saw. Each gave me a different response, and none of them saw the face that Key found so distinct. Key sees what he wants to see. Also, he repeats his unsupported belief that the brain can, at the nonconscious level, perceive distorted images that cannot be seen at the conscious level "without a special instrument." And what of this special instrument, the anamorphoscope? As Key says, "Anyone can construct an anamorphoscope by simply paperclipping a sheet of silver-mirror mylar around a 3-inch pickle jar." So much for technological marvels. The crux of the matter occurs when Key writes of "the significant investment of talent, time, and money" that went into making this picture. Remember, it is on the cover of Key's own book. Furthermore, this same picture and caption are on the cover of his sales brochure and lecture poster and figure prominently in his lecture. And it isn't just anamorphic embeds that he finds in this picture. There is much, much more.

During his lecture, Key described these embedded figures in detail. In the middle of the glass is a man with an erect penis. (Key calls him "The Flasher.") In the upper left-hand corner of the glass is a woman scolding him for drinking. There is another man located in the lower right-hand corner (who Key identified as the henpecked husband of the woman). While this complex scene was similar to several others he described in his lecture, the story became fascinating when Key, as an aside, mentioned that he started feeling guilty about having such a subliminally manipulative picture on the cover of his own book, since it would undoubtedly increase sales and yet was precisely what he was attacking in the book. Quite the moral dilemma! He called his publisher to express his concern, whereupon his publisher informed him that

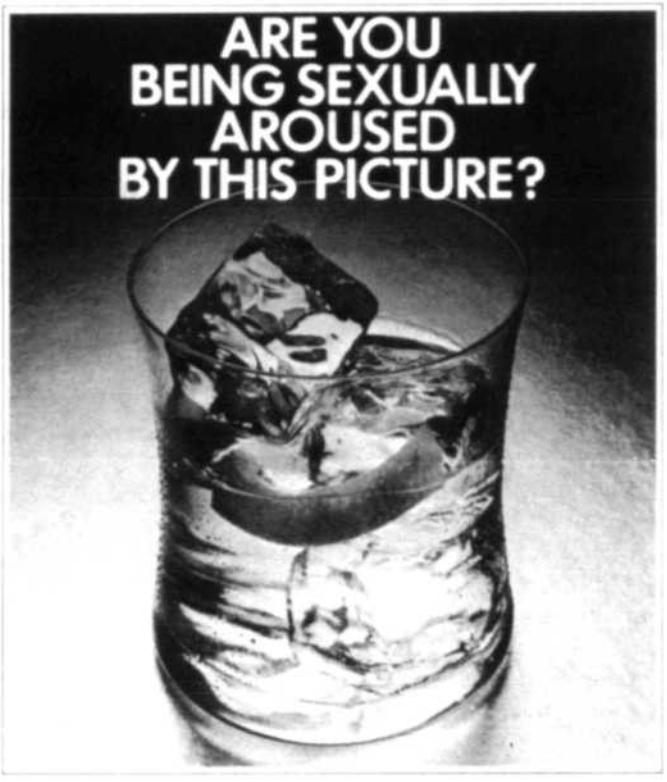

FIGURE 1

FIGURE 2

they hadn't taken the picture from an ad but had merely put a martini on the table and taken a photograph—no embedded images were used! At this point, Key just shrugged and said, "I guess it's my word against theirs." He had found this complex, diabolical scene embedded in the picture yet was informed that it was merely an unretouched photograph—nothing more, nothing less. This should have been a strong disconfirmation of his theory. I would think that a trained observer would stop and question the very nature of his thesis. Key didn't bat an eyelash. He did not seem to grasp the inconsistency between his theory and the evidence.

The inability to benefit from feedback appears to be the primary cause of pseudoscience. Pseudoscientists retain their beliefs and ignore or distort contradictory evidence rather than modify or reject a flawed theory. Because of their strong biases, they seem to lack the self-correcting mechanisms scientists must employ in their work. Science can be viewed as a special situation in which scientists acknowledge their human frailties and, through experimental design, construct situations in which their biases will have as little impact as possible. This process is even more critical in the social sciences, since the subject matter—namely, ourselves—is one on which we all have strong opinions and biases. Yet Key, like other pseudoscientists, is less interested in producing objective data than in impressing others with his brilliance.

Two examples of his research that Key offers in his lecture—cases that he considers central to his thesis—typify the design problems that consistently appear in his work. First there is the "clam orgy." This experiment was conducted at a Howard Johnson's restaurant. Following one of his lectures, Key and some students went out to dinner, and everyone ordered fried clams. Key soon remembered that he hated fried clams. What then had caused him to order them? Looking around the table, he came up with the answer. On the placemat was a picture of a plate of fried clams (not a photograph, but a $50,000 painting that, according to Key, should be hanging in the Louvre). To discover why this placemat had compelled him to order fried clams against his will, he and the students took turns describing what they saw embedded in the picture. This process, according to Key, lasted about four hours. In this time, they "discovered" embedded in the picture of fried clams "a sexual orgy, oral sex, and bestiality," with several entangled bodies and even a donkey. Furthermore, "this obscene information will be unconsciously perceived by every man, woman, and child who regards this placemat for even an instant" (Key 1980, p. 7). This may sound like a joke, but Key is serious enough about it to have titled his most recent book after it.

Research does not have to be done in a sterile lab to be important. However, no matter where it is done, it must be conducted in a way that results in unambiguous conclusions; and that was not the case with this work. The major problem with Key's "evidence" is that the participants did not independently arrive at the same conclusion regarding the presence of the orgy scene. Rather, Key and the students jointly created the results. Scientific objectivity requires that all observers *independently* observe an event. As this

research was conducted, the observations of one observer directly influenced the observations of the others. When dealing with ambiguous stimuli, one tends to see what others point out: a *perceptual set* exists. Key compounded the problem when he mixed a perceptual set with a little paranoia and made a great leap of inductive reasoning—that is, he concluded that what they as a group had read into the ambiguous stimuli had to have been intentionally placed there by the devious creators of the advertisement.

There is no reason to believe that, because a group of individuals can influence one another into seeing an orgy scene in a plate of fried clams, somebody intentionally created it so. Their observations could just as easily have gone in some other direction. If somebody had first seen the donkey as a part of a manger scene, an entire crèche may have emerged instead. In fact, people frequently see religious images in ambiguous stimuli and believe they must be divinely inspired. Recently, for example, people flocked to Fostoria, Ohio, to see a supposed apparition of Jesus on the side of an oil tank (Jaynes 1986). The point is that the clam-plate orgy is no more evidence of subliminal manipulation than is the apparition of Jesus of divine intervention. In the case of the clam-plate orgy, the data were accumulated under such biased conditions as to render them meaningless.

A second example that Key discussed at length involved a picture of Libyan leader Muammar Gaddafi on the cover of *Time* (April 21, 1986). According to Key, the word *kill* was embedded on Gaddafi's face so that it would be perceived subliminally but not consciously. Key described the research he had conducted to prove that the word *kill* had been subliminally perceived: Under hypnosis, six people reported to him that they thought of the word *kill* after seeing this picture. At first blush, the data might seem compelling, and it seemed to be to the audience at the lecture I attended. But, again, there is a problem. Key already knew what he wanted people to report. Under these circumstances, a good researcher sets up a "blind" experiment—one in which the hypnotist knows neither what the experimenter hoped to find nor what was seen by the subject. Without such controls, the evidence is worthless. I also suspect that there was some bias in the selection of subjects, since one of the six subjects Key hypnotized was his wife! Additionally, Key was in a position to "discover" almost anything he wanted to, since the hypnotic state is one of heightened suggestability—just the opposite of what is needed for good control when experimenter bias is of particular concern.

Key's theory of subliminal manipulation contradicts existing theory and therefore needs the strongest support before it can be accepted. But, instead, his data can easily be dismissed because of poor experimental design. Further, the process of subliminal manipulation he claims to see everywhere in advertising can be better interpreted within the framework of currently existing psychological principles.

For more than six decades, psychologists have based personality tests on the idea that people try to give meaning to ambiguous stimuli. The well-known Rorschach "inkblot" test is based on the idea that people will "project"

into the inkblots concepts that are important to them. People interpret ambiguous stimuli in a way that makes sense in the context in which they are operating. If you believe others in a group see an orgy in a plate of clams, then you will tend to follow, especially if a strong-willed authority is present. And if Key "knows" that images and words are hidden in ads, he will see them. The reverse of the old cliché is also true. Believing is seeing.

Even if subliminal messages *were* placed in ads, this would not be proof that they cause the product to be bought. Ads are based on well-known psychological principles, such as conditioning, perception, and social modeling. These factors alone could well be responsible for the effectiveness of ads, rather than any subliminal manipulation. But beyond the obvious flaws in Key's work from a scientific standpoint, there is a more basic problem with his thesis: The attempt to manipulate an unsuspecting public through subliminal exploitation is illogical.

Key alleges in his lecture, one of his books (1976, p. 10), and his advertising brochure that every Ritz cracker has the word *sex* embedded on it 12 times on each side. He continues, "The number and precise location of each *sex* embed appear to depend on the temperature and time during which each cracker was baked. The *sex*es are apparently embedded in the molds pressing out the dough. When baked, the *sex* patterns vary slightly from cracker to cracker."

Does this make sense? Consider what must take place for a Ritz cracker to have subliminally manipulating embedded stimuli. First, for the embed to show up in the finished product, it would have to be clearly formed in the molds that cut the dough, since the process of baking would destroy all but the most obvious impressions. The embedding apparatus would be obvious to anyone who worked with the molds in the bakery. It seems nearly impossible to me that bakery workers would not spread the word. If I worked in the bakery, I would love telling the guys at the local pub about all the "sex" we had at work. Yet, somehow, word hasn't leaked, even though Ritz crackers are manufactured in several localities. But there is an even bigger problem with this scenario. Nabisco, the manufacturer of Ritz crackers, impresses me as a company that would be very sensitive about its image. It is doubtful that it would risk a multimillion-dollar reputation on an at best dubious theory that subliminally manipulating embeds of the word *sex* might improve the sales of the product. This, like the rest of Key's theory, just does not make sense.

In summary, then, there is simply no evidence to support Key's thesis that subliminal stimuli are ubiquitous in ads. By Key's own account (1976, pp. 7, 190), those who are in a strong position to know (scientists and journalists) are adamantly opposed to his thesis. It is equally evident that Key's claims for the effectiveness of subliminal advertising also lack support. I have been unable to find in his writings or in the scientific literature even a hint of real evidence for the effect of subliminal manipulation in advertising. He appears to assume that it must be effective since, he believes, everyone is doing it (an unproven assumption). Yet despite this total lack of evidence, Key makes

bold claims for subliminal manipulation. The brochure he sends to colleges promoting his lecture states: "*Fact:* Most, if not all, psychosomatic illness originates from subliminal stimuli." This is a fantastic statement; yet not a shred of evidence is offered to support it in either his books or his lectures.

The Harmful Nature of Key's Thesis

Key's lectures and books are harmful in that he provides misinformation that in turn misdirects attention and promotes simplistic thinking. Key claims, for example, that advertisements contain sexual embeds and that these embeds are responsible for our purchasing behavior. To the extent that students and others believe Key, their attention is diverted from the aspects of advertising that should concern us all: the widespread use of overt (not subliminal), explicit (not symbolic) sexuality to sell products that have no connection with sexual behavior, the reinforcement of gender-role stereotypes, the fostering of consumption of unnecessary products, and so on. Furthermore, believing that subliminal manipulation is what makes advertising effective prevents people from recognizing the actual modes of persuasion employed by advertising. Failing to understand the real properties of advertising makes it more difficult to be an informed consumer: One is victimized by what one does not understand.

As a professor of psychology, I find the misunderstanding of human behavior resulting from Key's lectures most upsetting. My job is to give students an understanding of what we know and don't know about how and why humans think and act as they do. This is a painstaking, time-consuming process. The topic is complex, and one that is not easily grasped by students. Yet Key can tell a lecture hall filled with students that what they have heard in their classes is wrong and then present them with a simple-minded theory that is totally unsupported and contrary to all relevant evidence. Literally weeks of effort can be undone in two hours of a simplistic but effectively presented lecture.

While the body of knowledge concerning human action is complex, the process by which we have come to know it—scientific method—is even more so. The damage that Key and other pseudoscientists do to students' appreciation for this complex and subtle process should not be underestimated. By raising speculation to the status of evidence, Key makes the process look simple and easy. Why spend time in the lab when people will accept unsupported theorizing as fact?

Unfortunately, simplistic theories have a virtue: They are easily understood. This is especially crucial when one considers Key's primary audience—college students. From my experience, Key's lecture is accepted most readily by lower-division college students in particular. This is because a large number of first- and second-year college students are either still expecting to be told Absolute Truth or are in the difficult process of transition into more complex modes of thought in which they understand that nothing in the world is as simple as they once thought it to be (yet still wish it was).[2] Key's thesis that

the "unconscious brain" perceives everything instantaneously as well as his conspirators/victims dichotomy reinforces a student's desire for simple explanations to complex issues. Perhaps more important, it allows those in transition to complex thinking to *retreat* from the complexity of their college coursework to the comfort of right vs. wrong and obtaining certainty from Authority (Perry 1970, 1981).

In medicine, the Hippocratic oath instructs physicians that at the very least they should do no harm to anyone. It seems that something akin to a corollary of this oath should apply to lecturers and authors: If you are not in a position to enlighten, at least don't contribute to the overall level of ignorance in the world. Getting students to wrestle with the complex issues they will face in their lives is never an easy task, but it becomes even more frustrating when colleges—institutions dedicated to enlightening their students—are paying $80,000 to $100,000 a year to Dr. Key to have their students' intellectual development retarded.[3]

Notes

1. Key's use of the term *subliminal* is inaccurate. Subliminal perception would, by definition, require stimuli that by their very nature could not be consciously perceived. This is clearly not the case, since once he points them out to us we are supposed to be able to recognize them. If these stimuli were truly subliminal, we would never be able to see them. Most of his examples were of *embedded* stimuli, not subliminal, and to the extent that any of what Key talks about exists, it is selective attention, not subliminal perception. He simply does not distinguish between these two very different processes.

2. The work of William Perry (1970, 1981) is particularly germane to an appreciation of why first- and second-year college students are especially susceptible to Key's brand of pseudoscience. The "Perry scheme," as it has come to be called, is a model of young-adult cognitive development in which one progresses through stages from dualistic thought (we-right-good vs. they-wrong-bad) to complex thought (committed relativism), with several steps in-between. Dualistic thought is characterized by dichotomous, yes/no world-views, while relativistic thinkers recognize that there is diversity of opinion in the world and that these opinions may all have legitimacy. The feature of dualistic thinking most relevant to this article concerns the matter of Truth—the correct answer to all problems is known by Authority (experts, such as professors and outside lecturers), whose role it is to communicate Truth to students. To dualistic students, their role is to discover the Truth that Authority knows. For dualistic thinkers, the complexity of the material they encounter in their coursework is often frustrating.

3. If the fee my school paid Key is typical, he gets around $2,000 a lecture (plus expenses). Multiply his fee by the 40 lectures a year he says he gives, and the total is $80,000 to $100,000.

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Past Tongues Remembered?

What does linguistics analysis reveal about claims of reincarnation—that people under hypnosis often speak a language learned in a previous life?

Sarah G. Thomason

SUPPOSE YOU want to convince people that you've discovered a genuine case of reincarnation. If you can prove that your subject can speak the language of an earlier incarnation, that would obviously be strong evidence in favor of the reincarnation claim—provided, of course, that the language is not the subject's present native language and that you can also show that the subject has had no chance to learn the "past life's" language in his or her current lifetime. The reasoning would go like this: Speaking a language is a skill that requires extensive long-term exposure to the language. If a person has that skill, but lacks such exposure in his/her current lifetime, then the skill must have been acquired paranormally—for instance, in a previous lifetime whose memory lingers on.[1]

There are several published case studies in which reincarnation (or the related phenomenon of temporary possession of a subject by another personality) is proposed as the source of a subject's ability to speak a foreign language. The most impressive of these case studies are in two books written by Ian Stevenson (1974; 1984), who is Carlson Professor of Psychiatry at the University of Virginia Medical School. Stevenson has studied two native English-speaking subjects who, under hypnosis, manifest foreign personalities and seem to speak—very haltingly—foreign languages, specifically Swedish and German, respectively. To establish his subjects' linguistic competence in these languages, Stevenson arranged sessions in which native speakers of Swedish and German interviewed the subjects, questioning them about their past lives; in the second case, Stevenson himself participated in the interviews, since he knows some German.

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THAER WEARTH HREAM AHAFEN, HRAEFNAS WUNDON, EARN AESES GEORN.
I DON'T CARE ABOUT SHOUTS, RAVENS OR EAGLES, MR. BEOWULF. I ASKED YOU HOW YOU PUT YOUR PANTS ON.
B7
Skeptical Inquirer

The result of these interviews is what Stevenson calls "responsive xenoglossy"—speaking a language one hasn't learned in one's current lifetime, and speaking it in a responsive way in conversation. He considers *responsive* xenoglossy to be crucial for making the case for the paranormal phenomenon, as opposed to what he calls "recitative xenoglossy"—the mere ability to recite some words in a foreign language one hasn't learned. The reason, he says, is that "one can only acquire the ability to use a language responsively by using it, not by overhearing it spoken" (1984, p. 160). That is, you need practice to acquire the skill of conversing in a foreign language; and, if a subject falsely denies having had such practice, then it should be possible to uncover the fraud by careful investigation.

It must be emphasized that Stevenson is energetic in his search for fraud and also for unconscious recourse by his subjects to former but forgotten experience with the languages in question. For his "German" personality, Gretchen, for instance, he investigated the subject's opportunities for learning German normally. He visited the town she grew up in, interviewed her relatives and old acquaintances, and established (among other things) that the schools she went to did not offer German classes when she attended them. In this respect Stevenson's attention to proper methodology is exemplary, and there is no hint, here or elsewhere, that he is trying to fool anyone; perhaps the strongest evidence of his sincerity is his inclusion in his books of partial transcripts of the sessions in which the subjects were producing their xenoglossic Swedish and German, so that an independent investigator could actually check some of his data.[2] There is also no hint that his subjects are consciously trying to fool anyone.

However, in spite of Stevenson's efforts to provide genuine evidence in support of his paranormal claims, his linguistic evidence is completely unconvincing to a professional linguist. There are two main problems with it. First, his notion of "responsive xenoglossy" is fatally flawed as a methodological criterion for determining a person's ability to speak a language. And, second, most of the explanations he suggests for the obvious inadequacies of his subjects' Swedish and German put his paranormal proposal squarely into the realm of pseudoscience: Ultimately, Stevenson's explanations for the linguistic deficiencies render his hypothesis untestable by emptying it of content. I'll discuss each of these problems in turn, using illustrations from his "German" case. Then, after showing why Stevenson's method doesn't work, I'll outline a method that *would* work as a test of a person's ability to speak any given language.

First, consider the idea that you can't converse in a language without knowing it, and without having practiced speaking it regularly over a considerable period of time. This certainly seems like a reasonable idea, and of course it's also a valid idea if you're thinking of ordinary, normal conversation; anyone who has (say) studied French for a couple of years in high school, and then visited France, has probably noticed that it's hard to carry on a conversation in French with this minimal background. It may even be hard to ask directions to the nearest cathedral, and harder still to understand the answer if it's much more complicated than a pointing gesture. So one must agree with Stevenson that, if his subjects, without having learned Swedish and German, can in fact converse normally in these languages, then a paranormal explanation would seem necessary.

But, as Stevenson himself admits, what his subjects produce is far from normal conversation. He argues that their linguistic behavior is close enough to normal conversation to require a paranormal explanation (barring fraud): I—and I believe this is true of any other linguist who studies the data carefully—would argue that his subjects show no sign of any extensive exposure to Swedish or German, in any lifetime.[3] The issue, of course, revolves around the difference between the linguistic skills manifested by Stevenson's subjects and the linguistic skills manifested by a normal (as opposed to a paranormal) speaker of a language.

Consider what it means to know a language. First, any native speaker of any language has a vocabulary of thousands of words—certainly upwards of 10,000, probably many more. This is true regardless of schooling. Second, a speaker knows grammatical rules—not necessarily, and not only, the rules taught by a grade-school grammar teacher, but rules that enable the speaker to produce and interpret connected utterances that will be readily understood by other speakers of the same language. For instance, any speaker of English knows that a sentence like "Willy doesn't eat horseradish" is a perfectly good English sentence, while a sentence like "Not Willy horseradish eat" is not good English—it doesn't follow the rules of English grammar for any dialect of English. Children born into an English-speaking community, or any other community, have most of their native language's extremely complex gram-

matical rules under control, and a sizable fraction of its vocabulary too, by the age of four or five.

But compare this normal situation to what Stevenson's subjects are doing. His "German" personality, Gretchen, produced about 120 words in sessions with the hypnotist (her husband, who spoke no German). She produced only a few more words independently in her later sessions with German speakers. A number of these German words were either just like the corresponding English words, e.g., *braun,* which is identical in meaning and very close in pronunciation to English "brown"; or they were similar to the English word, for example, *blü,* the word she used for "blue"—which she pronounced with the non-English German vowel [ü] rather than with the English vowel sound, but *not* with the appropriate German sounds for this word (which in German rhymes with English "cow").

Since Gretchen usually answers with just a word or two rather than in full sentences, her minimal vocabulary does not include the numerous grammatically necessary but semantically empty words like helping verbs; and her answers to many questions indicate that she doesn't understand such words, either. In fact, all she seems to know, either for speaking or for understanding, is a handful of words.

Well, then, how does Gretchen manage to converse? The answer is that she doesn't, in any normal sense of the word *converse.* In the partial transcripts Stevenson provides, Gretchen's spontaneous contributions are almost entirely confined to identical, repeated comments about the danger she's in because people are listening. (Her fears apparently have to do with religious persecution connected with Martin Luther, and Stevenson's own analysis shows them to be completely unrealistic and anachronistic.) Otherwise, she speaks only in short answers to other people's questions. Often her responses are simply repetitions of what the interviewer just said.

Of Gretchen's 172 other responses, 42 are answers to yes/no questions (some asked in German, some asked in English). By "yes/no questions" I mean questions that require only "yes" or "no" as an answer. But yes/no questions don't count for much as a test of language knowledge, because all she has to do is say *ja* for "yes" or *nein* for "no," and she has a 50-50 chance of being right. In any case, since the questions are about her own past life, and no one else present knows anything about it, there is no way to tell whether or not her answers are factually accurate. Furthermore, she can answer any yes/no question even if she doesn't understand the content of the question at all—because the intonation pattern of yes/no questions in German is similar to the intonation of yes/no questions in English and *different* from the intonation of statements and other kinds of questions: Usually (though not always) there is a rise in pitch at the end of a yes/no question, but not in other kinds of sentences. You can check this by saying out loud the questions "Are you hungry?" and "What do you want to eat?" and comparing their intonation patterns. The German pattern is the same. So, for instance, when an interviewer asks Gretchen whether she has a doll, the question is: *Saq mir was von deinen Puppen. . . . Hast du eine?* (Tell me something about your

dolls. . . . Do you have one?) Gretchen can recognize the yes/no question by its pitch rise and can safely answer *nein,* though there is nothing in the following discussion about dolls to show that Gretchen has any idea what the interviewer is talking about.

So I think we have to throw out all of Gretchen's answers to yes/no questions as evidence for anything, except for a few answers other than "yes" or "no" that she gave to such questions. This leaves the other questions, those that require a content answer: 102 of these were asked in German, and 28 were asked in English. Gretchen herself speaks only "German," such as it is; but she does much better in answering English content questions than in answering German ones. When the questions were asked in English, she gave 22 appropriate answers, as against 2 inappropriate answers and 4 dubious ones. By contrast, and in sharp contrast to Stevenson's own analysis, I count only 28 appropriate answers to content questions asked in German, as against 45 clearly inappropriate ones and 29 copout answers, such as "I don't understand" and "I don't know." This isn't a very good score of appropriate answers, even before you eliminate some that are repetitions.

Now some of the answers that I consider inappropriate Stevenson considers appropriate, especially because he counts answers as appropriate when they are, in his terms, "appropriate associations to a preceding question, but not direct answers." Here's a typical example. The topic of discussion is food, and specifically what Gretchen eats at different times of day. The German-speaking interviewer asks, *Was gibt es nach dem Schlafen?* (What is there after sleeping? i.e., What do you eat for breakfast?) Gretchen answers, *Schlafen . . . Bettzimmer* (Sleep . . . bed-room). Clearly, Gretchen has not understood the question, which contains only entirely ordinary German words and constructions; instead, she has understood only the word *schlafen* (sleep), and she answers as if the question had been about *where* she sleeps—a wrong guess—and with the wrong word: her word *Bettzimmer* is made up of German *Bett* (bed) plus *Zimmer* (room), a literal translation of the English word *bedroom;* but the German word for bedroom is *Schlafzimmer,* literally "sleep room."

This is typical of Gretchen's linguistic performance. She does know a few German words—a tiny fraction of what a teen-age native speaker would know. (She is supposed to be about 14 years old.) She occasionally produces grammatically correct phrases, but in general she neither produces nor understands the simplest German grammatical constructions. When she doesn't understand a content question, which is often, she guesses; sometimes she guesses right—the topics of discussion in these interviews are very limited, so some right guesses aren't surprising—but more often she guesses wrong or says, "I don't understand."

The question is, do we need a paranormal explanation for her knowledge of some German words and phrases? Surely not; Stevenson's research into her background turns up a few opportunities for this amount of very limited exposure to German—World War II movies, a look at a German book—and that's all she shows any evidence of. What evidence there is, furthermore,

shows definitely that at least some of her experience with German is with the written language, because some of her pronunciations can only have come from an English speaker's reading of written German, not from a German speaker's pronunciation or reading. And the Gretchen personality can't be responsible for the subject's slight familiarity with written German anyway, because Gretchen says she can't read or write. The point is that Gretchen's level of "responsive xenoglossy" is so very low that Stevenson's argument about the necessity of practice to produce such a skill collapses. At best, she speaks German about as well as someone might who studied the language in high school for a year about 20 years ago.

On the other hand, Stevenson certainly needs some explanation for Gretchen's inadequacies as a German speaker, even with his generous count of appropriate responses to questions. He makes several suggestions to account for her lack of knowledge of her native language. One is that the Gretchen phenomenon represents only a partial manifestation of the foreign personality in the subject, and the part that manifests itself doesn't include much knowledge of the language. I have nothing to say about this, except that it does not seem to be a concept that lends itself to scientific testing.

Another of Stevenson's proposals is that Gretchen may have learned German inadequately because, although her father was supposed to have been a local official who "would presumably . . . have been at least a moderately well-educated man and a speaker of excellent German," Gretchen herself (according to Stevenson's conjecture) "was an illegitimate and neglected child who spent most of her time in the kitchen with a servant"; and since the servant was probably an uneducated person, Gretchen might therefore have come out with poor German-speaking skills (1984, p. 46).

Here Stevenson betrays his profound ignorance about language. Level of education has nothing at all to do with fluency. Even if Gretchen's father spoke educated Standard German and Gretchen herself spoke a substandard German dialect—conjectures which, incidentally, Stevenson makes on the basis of fragmentary and often inconsistent statements of Gretchen's—then their respective German dialects would have differed only in a small number of linguistic features; in most features they would have been identical, and in any case the two people would have been completely equivalent in their abilities to put sentences together coherently. So, though Stevenson could perhaps explain differences between Gretchen's speech and Standard German with such a hypothesis (at least, he could do so if there were any evidence to support his conjectures), he can't in this way explain Gretchen's near-total lack of grammar and her minimal vocabulary.

Stevenson's best attempt at an explanation is also the one he likes best. Perhaps, he says, "the grammatical and other imperfections [in Gretchen's speech] . . . may have arisen from the great difficulties involved in mediumistic communication" (1984, p. 69). Specifically, the earlier incarnation or the possessing personality has to talk through the medium of a native speaker of English, and this presents all the problems one finds (he says) with second-language learning by an adult: The English-speaking medium can't process

the foreign language properly because of the subject's own long-ingrained English speech habits, so things come out wrong—just as your pronunciation and grammar would come out wrong, if, with only a year or so of casual study, you tried to speak German. However, the cases he describes, if they were to be accepted as genuine paranormal phenomena, would not resemble second-language learning by an adult; instead, they would be more akin to cases in which an adult tries to speak a language that she/he learned in early childhood but has not spoken for thirty years or more. In both types of cases, pronunciation might well be affected by the subject's English; but, as mentioned earlier, several of Gretchen's pronunciation errors clearly arose from an English speaker's misreading of ordinary German spelling, not from the influence of the English sound system *per se.* In a long-unused native language, grammar could also be affected by the language normally used by the speaker in later life, but many basic grammatical constructions of the speaker's first language would remain intact.

More important, in all kinds of language learning and language loss a speaker's *passive* knowledge—the ability to understand the spoken language—is considerably greater than his/her *active,* or speaking, knowledge of the language being learned or forgotten. Significantly, Gretchen's German does not fit this well-established pattern at all. She clearly understands German just as little as she speaks it: There is no discernible difference between her active knowledge and her passive knowledge. In both speaking and understanding, her knowledge of the language is limited to words, and not even very many of those. So this proposal of Stevenson's also fails to account for Gretchen's linguistic deficiencies, though it could possibly account for some—just some—of her problems with the actual production of German utterances.

What all this means is that Stevenson's notion of "responsive xenoglossy" is not a good test of a subject's linguistic knowledge, because there is too much room for successful guesswork in a question-and-answer interview. The method also fails for other reasons, such as the investigator's bias in interpreting the results of the interview—namely, in counting appropriate vs. inappropriate responses. (In other words, you get the experimenter effect in judgments about the responses; and, in this respect, my skeptical judgments—as opposed to my strictly linguistic ones on points where there is clear evidence in the transcript—may be just as suspect as Stevenson's believer judgments.) So if you want a good test of a hypothesis about a subject's knowledge of a language, you need to find a method that makes guessing unhelpful and excludes the experimenter effect.

Here it is. It's very simple. First, take a word list of basic vocabulary (there are standard lists that linguists use in their field-work on previously undescribed languages)—100 or 200 words of the sort that any language is likely to have, e.g., words for "mother," "father," "moon," "water," "walk," "sleep," and so forth. Hypnotize the subject so that she manifests the putative earlier incarnation, and have her translate the word list into the language of that incarnation. Also, get translations of paradigms—e.g., "I walk," "you walk," "they walk"; "I walked," "you walked," etc.; "I will walk," "you will

walk," etc.; "I'm walking," etc.; and translations of simple sentences—e.g., "My dog eats bread," "Your dog doesn't eat bread," "Does my dog eat bread?" and so forth. Then wait a month or more. Hypnotize the subject again and have her translate the same items again—without, of course, giving the subject the opportunity beforehand to review what she said in the first session. (In fact, the subject should not be told what will go on in the second session.) If the subject knows the language in question, the translations should be real German, or real Swedish, or whatever the language is. In addition, though they might well show some variation (for instance, because many languages have different words that might translate the same English word), the translations should be mostly identical for the two sessions.

Second, test the subject for comprehension of the language—and remember that, if you want to assume some forgetting during intervening lifetimes, comprehension should be preserved better than production. Read the subject a short story in the language; make sure that the text contains only simple grammatical constructions. Then ask the subject questions about the story—they can be either yes/no questions or content questions, since you can tell what the answers should be, but content questions are preferable.

If the subject fails these tests, she does not know the language. This will not, of course, prove that the case is *not* one of reincarnation or temporary possession; but at least no one will be able to use the linguistic data as evidence in support of a claim that it is such a case.

As a postscript, I should add that I have used the first steps of this method to check the proposals of another hypnotist who believed that his subjects were speaking languages of previous lives under hypnosis. (The later steps turned out to be unnecessary because the first steps yielded a conclusive result; see Thomason 1984 for a description of these cases.) The hypnotist interviewed the "foreign personalities" using a word list I had sent him, and sent me tape recordings of the interviews for analysis. As in Stevenson's case studies, all the participants—hypnotist and subjects alike—seemed to be innocent of any intent to deceive. And, also as in Stevenson's cases, all the subjects seemed to be equally innocent of any systematic knowledge of the languages in question. Unlike Stevenson's data, however, the data I worked with provided sufficient evidence to test the hypnotist's hypothesis that his three subjects were speaking nineteenth-century Bulgarian, fourteenth-century Gaelic, and nineteenth-century Apache, respectively. The analysis showed that the subjects did not know the basic vocabulary of their putative earlier native languages; in addition, and perhaps even more significantly, it showed that their utterances in the "previous lives' languages" were so unsystematic as to be impossible components of *any* natural human language.

The linguistic performances of these three hypnotic subjects and of Stevenson's hypnotic subjects as well, in spite of the indeterminacy that results from Stevenson's flawed methodology, all point to the same conclusion: If you want to speak a foreign language, you will need to learn it through systematic exposure to its words and structures during your current lifetime.

Notes

1. There is also the possibility of divine intervention; this is the source that is sometimes claimed for "foreign-language speaking" in cases of *glossolalia,* or "speaking in tongues," in charismatic Christian churches. In this paper, however, I will be concentrating on reincarnation claims. For a thorough study of glossolalia, see Samarin 1972.

2. In his 1984 book Stevenson also discusses a third case, from India; but he gives very little data from this subject, so there is no way to arrive at an independent judgment on the material.

3. Among other things, this means that in these cases it seems unnecessary to deal so thoroughly with the question of possible fraud. If either subject cheated, the cheating was so unsuccessful that it might reasonably be compared to a case in which a student cheats on an exam by copying from the failing student sitting nearby.

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Is the Universe Improbable?

Some scientists claim that modified versions of arguments from design are confirmed by specific evidence from science. How well based are these arguments?

David A. Shotwell

PROMOTERS of belief in the supernatural never rest. At times they receive aid and comfort from scientists who claim that the hand of God is discernible in the findings of physics or biology. In its traditional form, this "argument to design" belongs to philosophy or metaphysics rather than science. Modified versions fall within our domain to the extent that they are said to be confirmed by specific evidence drawn from the sciences. It should be noted that "God," in some recent renditions of the argument, refers to an entity that is itself part of the universe and is a natural rather than a supernatural being. It is, of course, supposed to possess power and intelligence appropriate to its status as the creator of life. The existence of God, thus construed, may be a misleading way of stating a hypothesis that is testable, at least in principle, by observation and experiment. In that case, scientists who speculate along these lines are not explicitly endorsing supernaturalism. Religious fundamentalists, however, cite their views as evidence that science is in disarray and that its "materialism" has been refuted. Let's examine some arguments of this type.

Two recent examples will be considered. The first, due to Fred Hoyle and N. C. Wickramasinghe, purports to show that the complex structure of living organisms could have arisen only if it was deliberately created. The second, a special case of which is briefly discussed by Hoyle and Wickramasinghe, maintains that the existence of life depends upon a delicate adjustment of natural laws that would be very improbable in the absence of a Designer.

The advocates of both arguments rely upon calculations in which the

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theory of probability plays a central role. It is therefore necessary to state once more that mathematical reasoning, applied to the real world, yields conclusions no more reliable than the premises from which they were derived. In the first argument examined here, the crucial assumption is that certain events occur at random, or rather that they would do so in the absence of design and purpose. The following discussion is an attempt to show that the hypothesis of randomness employed in this way is untenable.

According to the view that appears to prevail among biologists, complex organic molecules were first formed in the oceans of the primitive earth. The probability that a single random trial would produce all the enzymes needed by living organisms is estimated by Hoyle and Wickramasinghe at $10^{-40,000}$. They conclude that the number of repeated trials that could have occurred early in the earth's history was far too small to have permitted the formation of these chemicals.

To assess this claim, let us apply essentially the same reasoning to a more elementary case. Consider an experiment involving two sets of objects. There are N objects in set A, the same number in B, and initially all are thoroughly mixed together. In the course of the experiment, each object comes to rest in one of two locations: position 1 or position 2. Apart from setting up the initial conditions, no human intervention is involved. Suppose now that the results are invariably as follows: Objects of type A are found to occupy position 1, while those of type B go to position 2. On the hypothesis of randomness, the 2^{2N} possible outcomes are all equally likely; this is what is meant by saying that the elements of an exhaustive and mutually exclusive set of alternatives occur randomly. The probability of the observed result, which is only one of the total number of possible cases, is therefore 2^{-2N}. If there are 10^5 objects of each type, this probability is less than $10^{-40,000}$, the value of Hoyle and Wickramasinghe's estimate quoted above. Following their reasoning, we conclude that unconscious nature could not have produced so remarkable a result. Where could the required information have come from? Only from an intelligent source, a superhuman brain within the universe, or perhaps ultimately from a God who somehow transcends it.

Disillusionment will follow, however, if we look at some details that were omitted from the initial description of the experiment. Let the objects of type A be made of cork, while type B objects are composed of lead. All are thrown into a tank of water; position 1 is at the top of the tank, position 2 at the bottom. The light ones float and the heavy ones sink, leading to the final distribution described. The explanation of this result requires nothing more than elementary physics and makes no appeal to natural—or supernatural—purposes. What then can be said about the very low probability that was calculated for it? At this point someone will object: "You didn't play fairly. Of course the probability value is wrong, because the cork and the lead objects do not take their positions at random!"

Precisely. This is the weak link in the argument of Hoyle and Wickramasinghe, as it was in that of Lecomte du Noüy and others of earlier vintage. When a natural process can result in two or more possible outcomes,

probability values cannot be assigned to these outcomes on an *a priori* basis. The hypothesis of randomness yields only one of an infinite number of possible distributions; it fits some situations well, but is incorrect in others. In particular, the combining of atoms to form molecules is not a random process. Among all logically conceivable molecular structures, those that actually occur form a subset that is very small compared with those excluded by the laws of chemistry. The existence of the complex organic molecules found in living cells is evidence that the probability of their formation was appreciable rather than negligible. Thus we can reasonably postulate that these chemicals were produced by impersonal natural causes, whether or not the relevant laws and initial conditions are completely known to biologists. If "Darwinism" includes the hypothesis that life arose through random molecular combinations, then the postulate that the combinations were nonrandom is indeed a modification of Darwinism. No biologist should find this objectionable, for the theory as stated by Darwin has already been extended and modified in a number of respects.

Hoyle and Wickramasinghe are aware of this alternative to their views, but they attempt to dismiss it. They call it "pseudoscience," the invention of a "unicorn" whose function is to arrange amino acids into enzymes, and they maintain that it merely substitutes "laws" (or "nature") for the God of the older religions.

There are, however, two significant differences. First, the postulation of such "unicorns," if one insists on that term, is normal in science. When scientists encounter puzzling phenomena that are not yet explainable by any theory, they typically assume that there is an explanation to be found, however long and arduous the road to its discovery may be. This is a pragmatic maxim, not a provable statement of fact; it reflects that optimism that every successful scientist possesses in some degree. One must acknowledge, however, that such optimism may be misplaced. Perhaps nature's depths will never be

completely sounded. That possibility, I believe, should be accepted with equanimity. Its acceptance leads naturally to another maxim: Resist the temptation to invent a bad explanation merely because a good one is not available.

Occam's Razor, which discriminates among competing hypotheses on grounds of economy and simplicity, is the instrument needed to deal with the second claim, namely, that biologists tacitly equate natural law to God.

The reasons why this claim is unfounded have often been pointed out and call for only a brief restatement. If the existence of design and purpose is to qualify as a genuine hypothesis—that is, as a candidate for scientific status—then its proponents must deduce from it some testable predictions that are not derivable within orthodox biology. In fact, however, they cannot do so. The only way in which the alleged purposes of the deity can be determined is to observe the course of nature. After this has been done, it can be said that his purposes were to produce exactly those phenomena that have been observed. Thus it is clear that this "hypothesis" is a fraud. It is parasitic upon orthodox scientific knowledge and has no additional testable and verifiable content. That is why biologists and other scientists have adopted an impersonal, mechanistic concept of natural law. In applying it they neither assert nor imply that any ghostly, intelligent agent lies behind natural phenomena.

These considerations apply if God is represented as a supernatural being, a creator and designer who is "outside" or "beyond" the universe. Hoyle and Wickramasinghe, however, postulate a complex structure within the universe, i.e., a brain, that created living cells and dispersed them throughout space. Their arrival here began long ago and continues today, a process that explains the presence of life.

This hypothesis is successful in one respect. It bypasses any difficulties that may attend the view that life originated spontaneously on earth. The difficulties, however, are merely postponed, not resolved. The authors themselves recognize this when they refer to the existence of a "chicken-and-egg problem," although they appear to believe that it would arise only if the brain were composed of organic molecules. But the brain, whatever the details of its structure may be, must possess a complexity to match its powers. How did it originate? If it is assumed that its creator was a supernatural being, then we have the standard argument to design. The brain, in that case, is superfluous. There is no direct evidence for its existence, and the search for indirect evidence is pointless; there is no need for an intermediary between God and the living things He created. If the brain is said to be of natural origin, we may refer to the authors' own objections to the supposed spontaneous formation of the first living cell. I have argued that those objections are unfounded, but if they were correct they would be equally appropriate here.

An additional puzzle is introduced by the suggestion that the brain itself may have determined what the laws of the universe were to be, and that its decision was motivated by the desire to produce as much living matter as possible. This is clearly a more impressive feat than the proverbial lifting of oneself by one's own bootstraps. The brain must have existed before it could decide anything; how could it manage to do so if the laws determining the

properties and behavior of its constituents were not already operative?

Hoyle and Wickramasinghe attribute the decline of religious faith, at least in part, to the influence of Darwinism. They imply that people who continue to attend church are on the right track, even if the details of their theology are false, while the "materialists" who stay away are wrong. If their case rests upon the tenuous speculations discussed above, we may well conclude that they have merely offered us two mysteries, or several, for the price of one.

Another line of argument is favored by some theorists. It relies upon the supposed improbability that the laws of physics should be such as to produce the universe we inhabit. Even a small change in any of the basic physical constants, it is said, would have resulted in an environment too hot, too cold, or otherwise unsuitable for the emergence of life.[1] It is concluded that life—in particular, the existence of human beings—is not "due to chance"; an explanation is required. The cosmologists who argue this way appear reluctant to endorse deism explicitly. They introduce instead the "anthropic principle," a name that denotes any of several related claims. Their unifying theme is an inversion of the conventional order of explanation: Our existence is said to explain why the universe has the structure and laws that it does have, rather than others.

The anthropic principle itself is incidental to the present discussion. Whatever plausibility it may possess depends upon the assumption that the universe is "improbable" in some sense. If the latter claim is unjustifiable or even unintelligible, as I believe it is, then the anthropic principle can be dismissed as a mere curiosity.

If we describe the universe as "improbable," we must have in mind some set of possibilities, of which it is one, and a way to assign numerical weights (probabilities) to elements, or aggregates of elements, in the set. How is this set to be specified? Here the first difficulty has already appeared. Perhaps the most we can say is that it includes all conceivable, or all logically possible, universes. It is doubtful that this suffices to yield a well-defined totality. It is not a finite or countable set, and it is not even clear how one might determine its cardinality. The same is true of the subset consisting of those universes in which consciousness and intelligence could arise. The restriction that intelligence could be associated only with "life as we know it" is unwarranted in this context if it implies that living organisms must have a molecular structure consisting of carbon atoms linked together. A different possibility is described by Fred Hoyle himself in his novel *The Black Cloud,* and one can imagine many others. Those we cannot now imagine might also be viable candidates, given suitable adjustments of the laws of physics.

If, however, possible universes are not too numerous, they can be matched one to one with the real numbers, and the problem reduces to a more tractable form. The selection of a universe becomes equivalent to the choice of an "arbitrary" element from the set of all numbers between zero and one. We may now ask who, or what, makes the choice?

If the universe includes, by definition, all things that have existed or will exist at any time, then it is an absurdity to suppose that someone, or some-

thing, could create the universe; this something would have to exist in order to create. If the universe contains only material things, such as atoms, human bodies, and galaxies, then the existence of a nonmaterial creator is at least imaginable. It might be thought of as a god, or even God, but I will refer to it noncommittally as the Agent. Suppose that the Agent selects a real number between zero and one and builds the universe that corresponds to it. How likely is it that our actual universe would be the lucky winner?

The answer depends upon the "weights" (probabilities) assigned to subintervals of the entire interval. Here each set containing a single number qualifies as a subinterval, as well as nondegenerate intervals, such as all numbers between ¼ and ½. The assignment can be made in an infinite number of ways, every one of which is equally valid *a priori.* Among them are infinitely many in which our universe would have probability zero. But for any specified positive number less than one, there are infinitely many others in which its probability would equal that number. (Each of these infinities is uncountable.)

Which distribution should be used to evaluate the probability that our universe would be selected? No nonarbitrary answer is possible. It might be thought that the uniform distribution, which assigns to each interval a probability equal to its length, could be justified by an appeal to the "principle of insufficient reason." In that case the existing universe would be no more, or less, probable than any other: Each would have probability zero.[2] This lends no support to the design argument or to the anthropic principle. The fundamental objection to it, however, is that there is no way to convert pure ignorance into knowledge—not even knowledge of probabilities. It appears that any attribution of probability or improbability to the entire universe is literally meaningless.[3]

This conclusion may leave one with a feeling of dissatisfaction. Is it not strange that life and consciousness have evolved, and is not some explanation called for? Orthodox cosmology has not solved the problem, but another approach is provided by the anthropic principle and the assumptions upon which it rests. If a skeptic rejects this solution, should he not offer us a superior alternative?

No. There is no reason to believe that there is any substitute for the slow, step-by-step process of formulating testable hypotheses and checking them by observation—although, as Hume put it two centuries ago: "Some astonishment indeed will naturally arise from the greatness of the object: some melancholy from its obscurity: some contempt for human reason that it can give no solution more satisfactory with regard to so extraordinary and magnificent a question."

This is not to imply that speculation, as such, is objectionable. It can be interesting, and it can be a stimulus that leads to discoveries. But wild speculation is one thing, and science is another.

Notes

1. This argument may acquire an unmerited plausibility if the effects of varying only one

parameter, without compensatory changes in others, are considered.

2. This is not equivalent to impossibility in the case of a continuous distribution.
3. See also Antony Flew's treatment of the design argument.

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Psychics, Computers, and Psychic Computers

A simple computer program can simulate the "precognitions" of psychics. But is it accurate?

Thomas A. Easton

MEXICAN DICTATOR SINGLE BUT PREGNANT!
ITALIAN COMMUNISTS TO DESTROY ST. PETER'S BASILICA!

Do you believe it? I don't. But my home computer said these things would happen. More precisely, my computer said:

> On April 10, 1990, a queasy plague fatal to women will strike Mexico City with divorced dictator.

And:

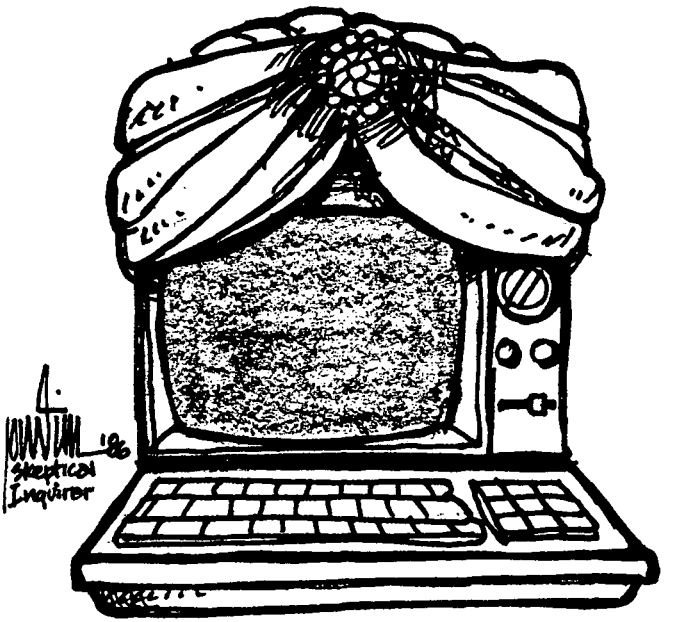
> On December 22, 1996, a pink tsunami will strike St. Peter's Basilica with political supplies.

The interpretations seem obvious, don't they? Now try these two:

> On March 9, 1992, a royalist sterility plague will strike Madrid with greasy fanatic.

> Chemical cure for criminals will first be possible on April 29, 1988, but it immediately will raise a tsunami for King Hussein.

Thomas Easton, a member of Science Fiction Writers of America, holds a doctorate in theoretical biology from the University of Chicago, teaches biology at Thomas College in Waterville, Maine, and has published widely in both academic and popular realms.



I interpret the first of this second pair to mean that on March 9, 1992, Basque fanatics will release a plague genetically engineered to render all members of the Spanish royal family sterile. The second seems to mean that shortly after Jordanian researchers announce a chemical cure for criminal behavior, on April 29, 1988, the Syndicate will put out a contract on King Hussein.

It's all hogwash. Isn't it?

My machine is sounding like a psychic, a Delphic oracle, a fortune-teller, and it's just begging to be contradicted. But only time will tell. Its predictions are set in the safely distant future, when its hearers will have forgotten the details. Happily, it can also count on its hearers to remember its "hits" better than its "misses"; human memories are selective, and human psychics take full advantage, as that skeptical observer of the supernatural, James Randi, has repeatedly shown.[1]

If any of my computer's predictions fail, the machine will keep its silence, careful not to remind anyone of its failures. If any prove correct, it will trumpet its success to the world, and you can be sure it will take full advantage of every ambiguity in its prognostications.

Human psychics do this, too. Consider the original Oracle at Delphi, a woman who, seated on a stool above a crack in a cave floor, breathed volcanic vapors until her head whirled. She gabbled then, uttering random noises, and her attendants, holy priestesses and priests, listened intently. When they thought they could hear some sense, they passed the word to the waiting supplicants outside the cave. They credited the prophecies to the god Apollo, but they were careful never to be too specific.

The classic example of Delphic ambiguity—and accuracy—is the story of King Croesus of Lydia, who sent an embassy to the Oracle at Delphi to ask whether he should cross the river to do battle with the Persian Empire. The Oracle—or her attendants—obliged, saying:

> When Croesus shall o'er Halys River go
> *He will a mighty kingdom overthrow.*

Sure that he could not fail—the god had predicted his victory, hadn't he?—the king charged joyously into battle, and he promptly lost his head. The Oracle hadn't said *which* kingdom would fall.

Other ancient fortune-tellers interpreted the tangled entrails of sacrificed animals, the flights of birds, the patterns of clouds, and the throws of knucklebones. Their modern equivalents seek significance in the reflections of light within a crystal ball, the muscular tremors of hands on a Ouija board planchet, the vagaries of dreams and tea leaves. In every case, they interpret the random gabblings of the universe. They impose on chaos whatever sense they can, and if the result bears any relationship whatsoever to reality—past, present, or future—they count themselves lucky and call the tabloids. And people love them, perhaps because they crave certainty, even spurious certainty, about the future.[2]

The technology of the traditional psychic remains much as it has always been. But the modern prophet now proclaims the wonders of computer simulation, feeding numbers and complex mathematical models into high-tech marvels that then spit out sophisticated graphs and tables to portray the future.

You say the future is not so deterministic? The psychics know that. They even introduce the element of chance with "Monte Carlo" methods, named for a famous casino. That is, they throw dice, just as did their mystical predecessors. And the gullible swallow it, just as they always have.

We moderns are in love with the aura of high-tech. We believe what the experts tell us when they point to their computers, even though a computer is no better than the people who tell it what to do. It is only faster. We forget that computers can do nothing to correct faulty assumptions or fill in missing data. The problem arises when computer users fail to realize that their assumptions are only assumptions and that their data are incomplete. They plug them into their machines, and when a machine says the sky is falling, the user takes it as gospel and tells the world all about it.

This is what happened in the early 1970s, when the Club of Rome predicted disastrous shortages of energy, food, and raw materials by early in the twenty-first century. However, disaster seems far less imminent now than it did then, at the height of the oil crisis. The Club's simulators took no account of human responses to threats, and that error threw off the Club's schedule for disaster. Partly in response to the Club's alarms, its assumptions have become invalid.

The Club's researchers had put more faith in the charts and graphs their

computer generated than the iffiness of their assumptions and the paucity of their data really justified. This is not unusual; many, if not most, computer simulators are guilty of the same sin, and most cannot claim that their predictions helped to make them wrong, even in part. They may hope for such a result of their labors, but when braced, a year or two later, with the evidence that the sky is not falling after all, they can say only, "Who me?" If their luck is in and they prove right, on the other hand, they are the first to grab the credit.

They act a lot like psychics, don't they? And this has made me wonder: Might we call a spade a spade and program a computer psychic? It would have no assumptions and no data. It would simply combine words randomly into sentences that sounded like predictions of the future. The machine would be as much a gabbler as the Oracle at Delphi, or the tea leaves at the bottom of a cup. It would be random, senseless. But a human, like the Oracle's attendants, could impose sense on the random utterances, being careful to remain somewhat vague and watching out for every opportunity to claim a little credit. And it should be just as accurate as any human psychic. After all, random is random and gabble, gabble. Would it work? It would certainly make "predictions" about the future. But would people believe it? More to the point, would the aura of high-tech make this random oracle any more believable than a fistful of dice?

As I asked myself these questions, I seemed to recall that someone once computerized the *I Ching,* but I had no idea how popular it became. I knew that a calculator tailored for astrological computations had been marketed. I had heard of no other attempt to computerize fortune-telling. Therefore, I decided, I would try it myself.

I wrote a program that could pluck words at random from eight different word-lists. Four of the lists held 200 each of assorted nouns, verbs, adjectives, and adverbs. Four more held 100 each of names of public figures (such as King Hussein), place names, disaster names, and possible technological developments (such as nose jobs for elephants). An additional piece of the program could pick dates at random from the next 20 years. Then I added a program section that could pick—again, at random—one of eight "sentence frames." These frames were much like those we know from the party game of Mad-Libs, looking like:

> On <date>, a <disaster> will <adverb> <verb> <name> in the <adjective> <noun>.

The program then filled in each </> blank with a word chosen, at random, from the appropriate list.

When I was done, I turned the program on to see what kind of "psychic" predictions it would make. I was not disappointed, for one of the first things the machine said was:

> Nose jobs for elephants will first be possible on January 6, 2002, but it immediately will incinerate a tsunami for Miss Manners.

Bearing in mind that psychics are supposed to be ambiguous, I studied this statement carefully. Interpreting it didn't seem too difficult, for it seemed to say quite explicitly that the first nose job for an elephant will leave Miss Manners speechless. It probably will.

I let the machine keep going, and it said:

> On October 7, 1987, George Bush will announce out-of-body travel. It depressingly will provide the lush prison-camps of voting fraud.

I was disappointed. This one didn't even need as much interpretation as the Miss Manners crack.

Then came:

> Total disarmament will first be possible on November 9, 2003, but it immediately will bankrupt a coup for Edward Kennedy.

That didn't need much work to make it:

> On November 9, 2003, Edward Kennedy's attempted takeover of the U.S. government will fall flat when the Administration announces a tentative total disarmament agreement.

Then the computer spat out:

> On May 15, 1987, 1000 ill people will call for responsibility in Houston. Their stupidly guiding advisor will be buried in Lima, Peru, with Joseph Kennedy III's sandy enemy. In response to this nationally sick event, Moammar Khadafy will say relatively, "I tiredly will cause wheezy answer for the victims."

Now I felt that I was getting somewhere! It didn't make any sense at all. Or did it? Applying the keen perceptions required of any oracle's attendant, I turned it into:

> On May 15, 1987, 1000 ill Houstonians will call for increased government provision of medical care. In response, Libya's Moammar Khadafy will say that they are objecting to one more example of U.S. state terrorism.

This was beginning to be fun, but I was glad I didn't believe in it. It was also beginning to get scary. The computer said:

> On December 20, 1993, a mangled nuclear explosion will strike Cancun with wheezy animosity.

I decided that meant:

> On December 20, 1993, the remnants of a once-vigorous terrorist group will explode a nuclear device in Cancun, Mexico.

Then it said:

> On October 9, 1990, Caspar Weinberger will announce automatic taxation. It fully will improve the immediate chewing gum of train collision.

That could only mean Weinberger would be either president or the head of the IRS and that, either way, he would have all taxes, with no deductions, subtracted from paychecks by employers, with the expected result being an

end to the national deficit and on-time Amtrak trains.

I had had enough, at least for the time being. The computer was making so much apparent sense that I was wondering what I had made! *Could* any of its predictions possibly come true? Or was that high-tech aura getting to me?

I did a quick calculation. With its vocabulary of 1,200 words and the sentence frames I had given it, the program could generate over 10^{26} (100 million billion billion) different predictions! Some of them had to be true, but I faced exactly the same problem as that of the monkeys and the typewriters: Leave them at it long enough, and they will write all of Shakespeare, or the Bible, or the Britannica, purely by chance. So, too, would my machine predict every headline of the next twenty years. The problem was sorting the real ones from the fake, the sense from the nonsense.

But that wasn't *really* the problem, was it? My machine was a psychic, a fortune-teller, and if I treated it just as if it were a human psychic I would have it make as many predictions as possible. And then I would wait. Every prediction that failed to pan out I would carefully shovel under the rug. Every one that came true I would trumpet to the world. And the world would believe! Wealth would be mine! All I needed was at least one verifiable prediction.

Almost sadly, I decided I was not about to generate a million or so random predictions in hope of hitting one or two on the head. I chose to move on instead, adding to my program the ability to answer questions typed in on the computer's keyboard. Now it looks for key words and generates answers that at least have the appropriate form. It says "Because . . ." for a "Why . . .?" It gives a place for a "Where . . .?" and a name for a "Who . . .?" And so on.

And when I was done, I asked my computer what the editor of this journal would say when he saw this article. The answer was:

> The popular murderer will medically calculate the green window.

I *think* that means he'll try to have me committed.

Never daunted, I asked my computer how the readers will react to this article. The answer was:

> By raising the shy survey taker.

I think that means they too will want me committed.

Notes

1. James Randi, *Flim-Flam! Psychics, ESP, Unicorns and Other Delusions* (Buffalo, N.Y.: Prometheus Books, 1982).
2. L. Sprague de Camp, *The Ragged Edge of Science* (Philadelphia: Owlswick Press, 1980). •

Pseudoscience and Children's Fantasies

Fantasy in children's literature can, depending on how it is used, enrich meaning and experience or distort scientific and artistic truth.

Gwyneth Evans

Some secret truths, from the learned pride concealed,
To maids alone and children revealed:
What though no credit doubting wits may give?
The fair and innocent shall still believe.

"Rape of the Lock" Canto I

AS ALEXANDER POPE teasingly assured us, children have always been susceptible to fantasies and fairy stories; the modes of apprehending reality to be found in them are suited to children's capacity for trust, metaphorical expression, and imaginative leaps beyond the literal. But at least since the Renaissance and the beginning of a concern for childhood as a special and vulnerable period of life, educators have been troubled about the influence of fantasy on young minds. Hugh Rhodes's *Book of Nurture* (1554) warns parents to "keep them from reading of feigned fables, vain fantasies and wanton stories . . . which bring much mischief to youth"; and in the nineteenth century there were many reformers like Mrs. Trimmer, who in her magazine *The Guardian of Education* denounced the fairy stories and Mother Goose as "only fit to fill the heads of children with confused notions of wonderful and supernatural events, brought about by the agency of imaginary beings." Without joining the old censors in their wholesale rejection of fantasy, one may still feel concern over the depiction in children's fiction of "wonderful and supernatural events" based on popular pseudo-

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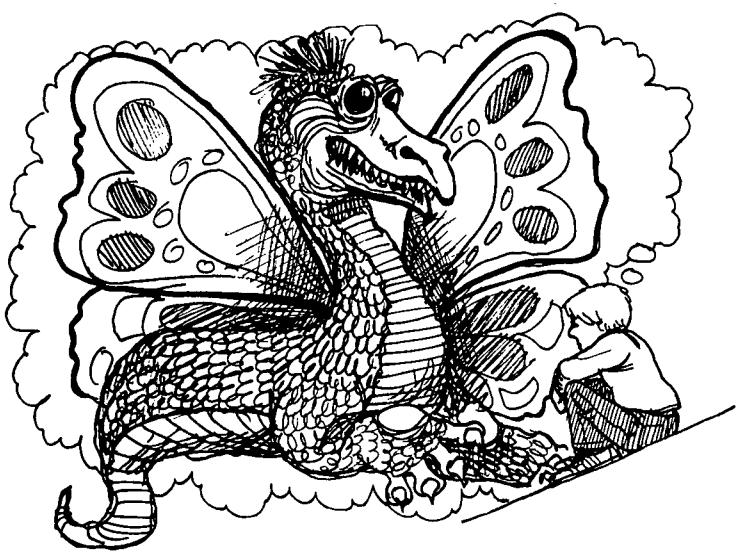

scientific speculation—telepathy, telekinesis, spiritualism, and various forms of psychic experience.

Fantasy, by definition, makes use of devices that are not in accord with a scientific understanding of the processes of nature. While art and science are concerned with different kinds of approach to truth, these approaches need not be in contradiction. It's not important to believe in the prophetic powers of three women who brew up toad spittle and eye of newt in order to enjoy *Macbeth;* works of literature like *Macbeth* and *The Portrait of Dorian Gray* use fantastic or "psychic" elements as devices to give an external manifestation of the inner nature of their protagonists, and only a very literal-minded observer is apt to be bothered that these devices are untrue to a rational, scientific observation of life. In considering children's stories, however, the issue becomes more complex. Fantasy has, rightly or wrongly, become particularly identified with children's literature, yet children are on the whole less able than adults to distinguish between the probable and the possible, to determine what is literary convention and what is a serious depiction of the real world. I believe that there is a problem, not with fantasy, but with fantasy that presents psychic and other pseudoscientific phenomena in a serious, realistic, and troubling way, encouraging young readers to believe that such events could and even should occur in their own lives. Discussing how books can deceive children and distort their sense of the real world, C. S. Lewis (1973, p. 236) remarks:

> I think that what profess to be realistic stories for children are far more likely to deceive them [than are fairy tales]. I never expected the real world to be like the fairy tales. I think that I did expect school to be like the school stories. The fantasies did not deceive me; the school stories did. All stories in which children have adventures and successes which are possible, in the sense that they do not break the laws of nature, but almost infinitely improbable are in more danger than the fairy tales of raising false expectations.

When fantasy presents itself in the guise of realism, however, it too can raise many false expectations—and fears.

Fantasy in children's fiction takes many forms. Most give delight or at least amusement to the reader. Some can extend his or her empathy and insight into the real world. Fantasies like *Alice in Wonderland* and *The Phantom Tollbooth,* which move from a dull or problem-filled real world into another reality or "secondary world" (to use J. R. R. Tolkien's term) are appreciated by most children over seven or so as obviously excursions into an imagined terrain whose relevance to ordinary life is oblique, not direct. The same is true of books like Tolkien's own *Hobbit* that concern entirely imagined worlds, or science-fiction novels set in the future or outer space. The devices of other fantasies, such as the *The Borrowers'* conception of a race of six-inch-high beings who live behind wainscoting, or the comic tone of others like *The Ghost of Thomas Kempe,* preclude the reader's taking these fantasies, though set in the real world, as being realistic descriptions of likely events.

One of the most interesting types of fantasy, however, painstakingly creates a sense of a real, modern, ordinary environment, in which a child character with whom the reader is encouraged to empathize has a psychic or otherwise pseudoscientific experience. The child may encounter a being from another time or dimension, be transported to another time or dimension, or find him or herself endowed with telepathic powers. The carefully established realism of setting and characters can readily lead to the psychic experience described. Unlike the six-inch Borrowers or the comical ghost, the possibility of demonic possession, telekinesis, or encountering the spirit of a long-dead person can seem real, even probable. Some fantasies of this sort, in children's as in adult literature, just use the pseudoscientific phenomena for cheap thrills. Among the more thoughtful and interesting books, some—the best—make use of them as a way of extending the child's imaginative sympathies. In certain others, however, the presentation of the psychic phenomena is serious and seems to be an end in itself: These books encourage belief in a way that is alarming or deceptive, or both.

A brief study of six notable modern children's books that use pseudoscientific material in a variety of ways may help to clarify when such use legitimately serves the purposes of the fantasy, and when it becomes a distortion of both scientific and artistic truth.

In the first pair of books, William Mayne's *A Grass Rope* (1972 [1957]) and John Christopher's *The Prince in Waiting* (1974), we find children engaged with what are apparently supernatural powers, but discover at the end of the books that there is a rational explanation for the apparently magical. This final revelation, which converts the impossible to the plausible, has been a technique of fiction since Anne Radcliffe in 1794 gave a rational account at the end for all the gothic horrors of *The Mysteries of Udolpho.* Both of these modern children's books do likewise; in addition, they indicate to young readers why many people find supernatural explanations more appealing than scientific ones. Christopher's novel is the first in a trilogy

Christie Harris's *Sky Man on the Totem Pole?* (illustration from the book, by Douglas Tait) suggests that images of Northwest Coast carvings may have been influenced by visits from ancient astronauts.

Cover of Peter Dickinson's *The Gift* (illustration by Alun Hood). This novel uses the character's ability to see into other people's minds not to encourage belief but to explore the complexity of human nature and examine the difficulty of moral judgments.

about an anti-technological society in twenty-first-century England. Its hero, a conventional but sensible boy, is suspicious of the powerful Seers, a priesthood whose guardianship of the prophetic Spirits gives them great influence over the superstitious secular society around them. Eventually the Seers reveal themselves to him as not the foes of machinery and free inquiry that they appear to be, but as a beleaguered band of scientists seeking to preserve knowledge and using their technological skills to protect themselves and their machines from a society that respects only the psychic and magical. Their revelation that the Spirits are illusions created by technological trickery does not diminish the book (as it does somewhat, *The Wizard of Oz*), because the mission of the Seers to preserve civilization and pass on scientific knowledge is a real value in the book, made far more convincing than the shadowy world of the Spirits in which the rest of the society has come to believe. What seems through most of the novel to be a clash between temporal and spiritual power is revealed as actually a secret struggle between an anti-intellectual governing class and the scientists who cautiously try to control and lead them.

Mayne's *A Grass Rope* takes another approach to the rational explana-

tion. A group of children in Yorkshire investigate what seem to be miraculous events attached to a local legend. While the older children use experiment, research, and logic to find the truth, the youngest child, Mary, is absorbed in her quest to capture a unicorn with a grass rope that she has woven. Impatient and uncomprehending of the attitude of the others she pursues her own vision; at the climax of the book, her perilous night journey into a disused mineshaft that she believes to be Fairyland rewards Mary with discoveries that enable the others to account for the old mystery. She is content with her own explanation, and her older sister, Nan, also chooses to cling to the possibility that there are fairies and unicorns after all. Of the single-horned skull found in the mineshaft, the father comments (pp. 120-121):

> "I don't think it's quite so strange as it looks. . . . It's not very hard to grow unicorns—in the right country, that is, not England"
>
> "Go on," said Adam. "There must be an explanation. What is it?"
>
> "Don't tell us," said Nan. "I don't want to hear."
>
> "Don't listen," said Daddy. Nan blocked her ears whilst Daddy explained to Adam.

The story lets us have it both ways: As the explanation of this particular discovery is not given to the reader, we may search it out for ourselves, as Adam would, or choose to leave open the imaginative possibility of unicorns. Either way, Mayne indicates that there *is* a rational explanation for the apparently magical, but doesn't force it on those who prefer to cling to magic.

This open-ended conclusion is handled very lightly and gently in Mayne's novel, the different attitudes shown as an aspect of the different ages and personalities of his characters and presented without any authorial comment. Quite a different approach is used in Christie Harris's *Sky Man on the Totem Pole?* (1975), which with Margaret Mahy's *The Haunting* (1982) I will use as examples of poor handling of psychic material in children's fiction. As the question mark suggests, Harris tries to present an open question: Were the images of Northwest Coast carvings and legends influenced by the visit of astronauts from outer space in ancient times? The book, an uneasy mixture of legends, historical fiction, and pseudoscientific speculation based on *Chariots of the Gods?* and *The Secret Life of Plants,* is framed by the story of a modern native boy who is ashamed of his culture until he discovers, through works such as those just mentioned, that modern scientific research indicates that many of his ancestors' stories and beliefs were based on fact and are therefore "true." The book implies that the only real truth is scientifically validated, literal, factual truth and that stories and artistic works have no value unless they deal with that kind of truth. Not only does this novel itself treat ancient-astronaut myths as historical accounts and insist on the value of emotional relationships with vegetables; Harris also, in her introduction and concluding book-list, encourages readers to speculate about how "recent scientific discoveries" (Velikovsky, von Däniken, and *The Secret Life*

of Plants are the authorities cited) may be proving the old stories true. Fiction with such an inadequate approach to both science and the nature of myth might seem hardly worth discussing here were it not that the author is a prominent and award-winning children's writer who has written many better books; unfortunately, this particular one has been prominently displayed for some years in the bookstores of major museums in the Northwest.

Although a much better-written book, Mahy's *The Haunting* (1982) also deserves to be questioned on the grounds of its depiction of psychic phenomena. Mahy describes the haunting of a little boy, Barney, by means of mental images emanating from his great-uncle Cole, presumed dead for some years. As Barney struggles unsuccessfully against the terrifying sensations of possession by Cole's spirit, he and his sisters learn that magical powers (of thought-transference and other psychic abilities) have been passed on for generations in their family. Their great-grandmother had had such powers but denied and repressed them and, by attempting to do the same with the psychic powers of her son Cole, had driven him to violence and madness. Cole's threatening spirit approached Barney, slowly and ominously; the account of his death proves false, and he appears in person to claim Barney as his own. He is thwarted, however, by Barney's sister, who had also inherited psychic powers. Realistic scenes of family life accompany the description of psychic possession; the only characters who deny the reality of the magicians' powers are either lying or close-minded and eventually obliged to admit the truth. Nowhere are these psychic powers truly questioned, and the novel ends with the family forced to recognize and live with their reality. While Mahy does not editorialize, as Harris does, or provide a reading list to back up the claims of her fantasy, the effect of the book's treatment of psychic "gifts" is to make them seem deserving of recognition as a very real, and terrifying, part of human experience. I'm sorry to say that *The Haunting* was itself recognized by the [British] Library Association with the Carnegie Medal for the best children's book of 1982.

The Gift by Peter Dickinson (1973) similarly describes a young person with an inherited psychic power, but in this book the power is used by the author for purposes other than just to scare the reader or to encourage him to believe in such powers. Davy's ability to see the images formed in other people's minds leads him into serious ethical dilemmas, as he by chance discovers his father's involvement with criminals. The whole direction of this novel is against simplistic judgments and supernatural solutions: The family relationships are complex and unconventional, a political issue (the use of violence by the Welsh Nationalists) is explored with some sensitivity, and the action is exciting without becoming melodramatic. At the climax we realize that Davy's gift is more than just a magicial power: It gives him compassion and empathy for the person whose thoughts he perceives, even for the violent and half-witted man who is seeking to kill his family. The novel abounds in ironies and acute perceptions about human behavior; "the gift" is used by Dickinson, as by Davy, to come closer to the complexity of human nature and the difficulty of making easy moral judgments. The psychic power is not

treated as an end in itself, but as a means to a larger end. Davy's eventual loss of his "gift" is a part of his achievement of maturity and responsibilities in the real world, and so interesting has Dickinson made these that the loss of the psychic power is hardly noticed.

This achievement of maturity is the purpose, also, of the psychic occurrences in Philippa Pearce's *Tom's Midnight Garden* (1958), a classic of modern children's literature, which describes a boy's nocturnal encounters in a garden with a girl of the Victorian period. At the close of the novel, Tom discovers that the unapproachable old woman living upstairs is in fact his young friend Hattie of the midnight garden; disregarding the 70 years between them now, the two walk, understand, and delight in each other. The old woman's dreams of the past combine with Tom's present loneliness to make it possible, when the clock strikes 13, for Tom to step out of the back door of a modern house into the garden of Hattie's childhood. Speculating about time, Tom gets little help from his erudite but unsympathetic uncle, who has command of lots of facts and theories but little interest in how other people think and feel. This is precisely what Tom learns in his own magical encounters with the younger Hattie, which eventually enable him to become friends with the old lady. The fantastic occurrences of the novel serve a larger, humane purpose of linking two people of widely different ages and creating love and understanding between them. No attempt is made to insist that the reader *believe* in Tom's experiences; what is made relevant to the reader's life is not a psychic experience but the possibility of friendship across the generations. A similar humanistic theme is the center of a more recent time-travel fantasy, *The Olden Days Coat* (1984) by the distinguished Canadian novelist Margaret Laurence, where a little girl learns to appreciate her grandmother differently after a slip back in time lets her encounter the grandmother as a little girl herself.

Perhaps the best guideline in studying the use of psychic phenomena and other forms of pseudoscience in children's fantasy is this: Is the depiction of such phenomena the chief aim of the novel or are they used simply as a device, for a larger purpose, such as the gaining of compassion and insight into other people? Fantasy is a rich and varied form of literature that can offer both children and adults an indirect and multifaceted approach to the meaning of experience in the real world. To encourage a willing suspension of disbelief through realistic setting and detail may be a desirable goal in some kinds of fantasy, such as *The Gift* or *Tom's Midnight Garden,* where a magical experience helps a believable modern child character to enlarge his understanding and cope with the demands of real life. If the reader's attention is clearly directed to the human experience, or even just the fun and adventure, achieved by the magical means, the fantasy does not deceive or offer false expectations. Indeed, it may become a means of revealing to the reader why many people are attracted to pseudoscientific explanations of natural phenomena *(The Grass Rope)* or how they can be manipulated into false belief *(The Prince in Waiting).* If, however, the bent and purpose of the fiction seems to be to inculcate belief in fantasies, notably the existence of pseudo-

scientific phenomena like those depicted in *Sky Man . . .* and *The Haunting,* as if they were demonstrably a part of ordinary reality and ought to be recognized as such, this fiction does a disservice to the genre and to the children who read it.

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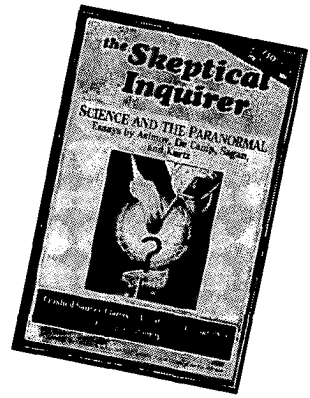

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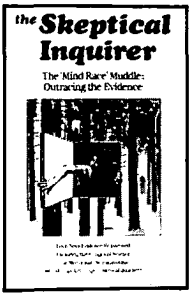

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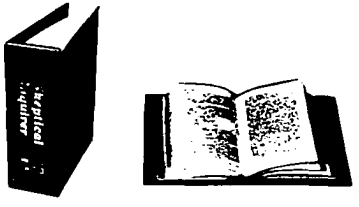

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Book Reviews

Assessing Arguments and Evidence

A Field Guide to Inductive Arguments. By K. D. Moore. Kendall/Hunt Publishing Company, P.O. Box 539, Dubuque, IA 52004. 1986. 161 pp. Paper $9.95.

Ray Hyman

Courses in logic emphasize deductive logic, but the arguments we encounter and use in our daily activities are inductive. Unlike deductive arguments, inductive arguments yield conclusions that go beyond the information contained in the premises. Even if the inductive argument is reasonably sound, the conclusion follows only with a certain degree of probability. Although an inductive argument can never convey certainty, it can possess varying degrees of reliability. K. D. Moore's *A Field Guide to Inductive Arguments* aims to help the reader evaluate four types of very common inductive arguments.

Moore, who teaches in the Department of Philosophy at Oregon State University, succinctly summarizes the book's goals: "Students who have completed this book should be able to recognize several patterns of inductive argument when they appear in ordinary discourse. They should be able to argue reliably using any of the several patterns of reasoning. And they should be able to evaluate inductive arguments, making a judgment about the reliability of the conclusion based on their knowledge of what makes an inductive argument strong or weak."

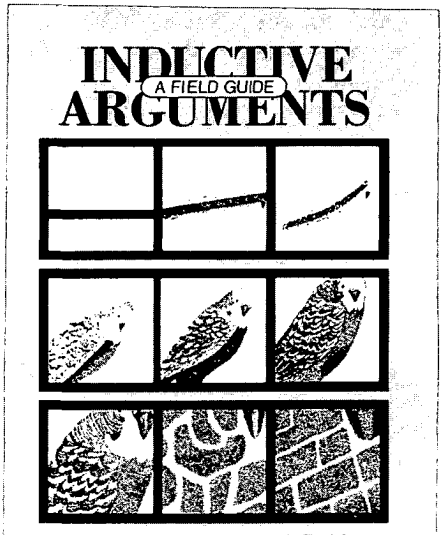
She devotes a separate chapter to each of four types of inductive argument: arguments by analogy, enumerative induction, hypothetical reasoning, and causal arguments. Chapter 1 ("How to Find Arguments") provides useful guidelines for analyzing an argument. And the last chapter offers a short, but helpful, checklist for quickly assessing suspicious claims.

The book's major characteristic, however, is the varied set of exercises accompanying each chapter. These exercises, homework problems, and examples are deliberately chosen to be both interesting and controversial. The excellent selection includes games, such as Eleusis; group projects, such as a handwriting experiment; and exercises on such topics as pornography and rock music, abortion, legislation on seat belts, vitamin C and the common cold, reasons for the extinction of the dinosaurs, fossils and creationists, the growing of hair on bald heads, and the relationship

Ray Hyman is professor of psychology at the University of Oregon, Eugene.

of pornography to sex crimes. The readers of this journal will be interested in the exercises and examples that deal with astral projection, astrology, biorhythms, Clever Hans, handwriting analysis, firewalking, psychic surgery, remote viewing, the shroud of Turin, UFOs, and water witching.

For each pattern of reasoning, Moore provides a definition and a set of guidelines for analyzing the argument. This is followed by advice on how to evaluate each type of argument. She discusses both how to disconfirm as well as how to confirm the conclusions. The emphasis, however, is always on practicing these guidelines in the excellent selection of exercises.



The book is both short and simple. Of course simply reading the book (this could be done in one sitting) and glancing at the exercises would not improve the reader's ability to evaluate arguments. Its value lies in the exercises. Only the reader who carefully works these through will benefit. Analyzing and evaluating arguments is a skill that can only be attained, and maintained, with hands-on practice. Simply reading Moore's suggestions will no more improve your critical thinking than will diligently reading the driver's manual enable you to be a good driver.

The targeted reader of this field guide is the student in an introductory logic course or a course in critical thinking. Moore also recommends it for courses in legal reasoning, research methods, and scientific reasoning. The book may be useful, she suggests, to all of us: "Anyone—college student or not—who is interested in enriching his understanding of the argument strategies used all around him, anyone who would like to strengthen his defenses against false or deceitful claims, anyone who needs to be able to build good, strong arguments will find this book interesting and useful."

All of us, then, can benefit from *A Field Guide to Inductive Arguments.* But again, to improve your ability to evaluate arguments, you must carefully *work through the examples.* And then you must continue to practice by constantly applying what you have learned to the arguments and claims you encounter daily.

Moore's approach is, of course, just one of many attempts to help us cope with the myriad claims that constantly bombard us. The strengths of this particular contribution are its simplicity and readability and its interesting exercises. The weaknesses or limitations may, in part, stem from her attempt to keep matters simple. Some can easily be corrected in future editions. In its present version, the book is much better suited for the classroom than for the individual. Some of the exercises require the participation of several individuals. The book would be much more useful if the author provided samples of worked-out answers against which readers could compare their own.

Although I applaud Moore's emphasis on properly analyzing arguments, I believe that the manual fails to help the reader to distinguish the four different inductive arguments as they occur in natural settings. This is because the exercises for "Argu-

ments by Analogy" only occur in the chapter bearing this title. And the exercises on "Causal Arguments" only occur in that chapter. The same is true for the other two types of arguments. What is needed is a chapter or set of exercises in which the various types of arguments are mixed. It is one thing to properly analyze a causal argument when the reader knows in advance that the exercise contains a causal argument. But, to simulate reality, the reader needs practice in analyzing arguments for which the specific pattern is not designated in advance.

Although the title implies that the book is a "field guide," in actual fact, it is a workbook. A field guide would be something one could carry into the field to be consulted whenever an argument is encountered. *A Field Guide to Inductive Arguments* in its current version has neither the format nor the physical properties to serve this function. It would be awkward to flip through its pages looking for the proper checklist or guidance. And the 8½-by-11-inch size makes it impossible to carry in one's pocket. Possibly, a future edition could include one or more checklists on a small cardboard foldout that could be easily carried for quick reference.

Perhaps the book's most serious omission is its failure to warn the reader of its limitations. Moore makes it clear that the book does not deal with deductive arguments and that only four patterns of inductive arguments are considered, but it would help if she had indicated which types of inductive argument, if any, are *not* covered. Future editions would be improved if it were made clear what sorts of arguments cannot be dealt with in terms of the tools provided.

No single book should be expected to prepare its readers for all contingencies. But it would greatly improve the value of Moore's book if she pointed out the sorts of situations for which the reader should seek additional help. In addition, it would be more useful if she listed sources for such additional help.

Many fellow skeptics have asserted, in my presence, that if everyone were properly educated in critical thinking no one would be taken in by inadequate arguments for paranormal claims. Although these skeptics do not provide details on just what training in critical thinking ought to include, I get the impression that they have in mind what is currently taught in courses in elementary logic and scientific reasoning. Such courses teach the students rules and procedures that can be applied to the premises and conclusions of arguments to see if the conclusions are warranted by the premises.

Psychologists have been accumulating evidence that suggests that such courses unfortunately fail to protect the students from falling for the same illogical and unscientific arguments that convince those who have not had such training. One problem may be that these courses focus on what to do *after* the argument has been carefully specified. Psychological research has been discovering that the major problem most of us face is how to recognize and specify the premises and the type of argument that must be dealt with. Knowing how to deal with argument of type X is not of much help if we do not recognize that the argument before us is of type X.

In this regard, Moore's manual is somewhat of an advancement. She realizes that being able to analyze an argument into its basic components is essential to making a proper evaluation. But she fails to provide instruction and practice in how to classify arguments into their proper type when they are encountered in real-world settings.

The current psychological research on the importance of the ability to adequately recognize what sort of argument one is dealing with is consistent with the earlier research on problem-solving, creativity, and reasoning. The early investigators of critical thinking focused on the thought processes that occurred after the thinker was presented with a carefully specified problem. Again and again the results were disap-

pointing in that individual differences in such thinking processes did not seem to be critical in succeeding or failing to solve the problem. More important was how the thinker represented or formulated the problem in the first place. Once the problem was formulated properly, most thinkers could arrive at an adequate solution.

Properly formulating the problem is a skill that is difficult to reduce to specific rules of the sort used to teach logical and scientific procedures for testing claims. It has to be developed with practice and requires experience with the domain in question. In my attempts over the past 20 years to teach students how to cope with paranormal and borderline claims, I have learned that it does little good to try to teach them formal procedures for logically evaluating arguments or for testing specific hypotheses. I have had much more success in drilling them on systematically asking the right sorts of questions. This is why I believe that the most useful chapter in *A Field Guide to Inductive Arguments* is the first one on "How to Find Arguments." I would especially emphasize the advice in this chapter on how to analyze arguments. Moore wisely writes (p. 2):

> In order to evaluate an argument it is necessary to understand it. And in order to understand an argument, it is often necessary to work quite hard to find out what is being argued for, and why, and how. Many arguments are confusingly presented, with major parts omitted, unclear, or tangled together. As a result, a careful reader must begin by sorting through an argument, looking for its most important parts.

Moore provides the following list of questions to help the student analyze an argument: (1) What is the issue? (2) What is the speaker arguing for? (3) What reasons is the speaker offering? (4) Are the premises true? (5) How well do the reasons support the conclusion?

I suspect that most people, regardless of prior training in logic or critical thinking, would greatly improve their ability to deal adequately with paranormal claims if they subjected the arguments to such questions before attempting to draw any conclusions. The reader may find it worthwhile to compare Moore's set of questions with the following ones I developed for the students in my course on pseudopsychologies:

1. What pseudopsychology (or pseudopsychologies) is under discussion?
2. What are the explicit and/or the implicit claims being made by the proponents of the pseudopsychologies being discussed?
3. What sorts of evidence and arguments are used by proponents to justify the claims?
4. How well do the evidence and the arguments justify the claims?
5. What sorts of evidence and arguments would be required to justify the claims for this pseudopsychology?
6. What alternative reasons can be hypothesized to account for beliefs in the pseudopsychology even it is invalid?

My first five questions achieve the same ends as Moore's. My sixth goes beyond evaluating the argument and tries to get the student to think in terms of those psychological factors that can create belief. My experience indicates that the students require practice and some feedback before they acquire the knack of using these questions effectively. I have them read three books. For each book they produce a short paper by writing answers to the six questions. The books I currently use for this purpose are Vogt and Hyman's *Water Witching U.S.A.*, Blackmore's *Beyond the Body*, and Marks and Kammann's *The Psychology of the Psychic*. By the time they have completed evaluating the pseudopsychologies discussed in these three

books, almost all the students are able to successfully complete a term paper in which they evaluate a pseudopsychology of their own choosing.

Both inductive and deductive logic provide guidelines for evaluating how well a conclusion follows from the premise. But logic does not help us decide whether the premise is true or false. An argument might be logically impeccable, but rely on factually incorrect evidence. So it is important to gauge the trustworthiness of the "facts" that the claimant puts forth to buttress his or her claim. One of the most unfortunate aspects of many skeptical attempts to provide a normal "explanation" for a paranormal claim is that the "explanation" is based on the events *as reported* rather than as they *actually happened.* It is futile to try and evaluate an argument for the paranormal if the "facts" are not of the highest quality.

How can we judge the quality of the evidence? This is not an easy matter. Here again, no simple set of universal rules exists. In addition, the judging of the reliability of the data can require highly technical skills in statistics, instrumentation, and scientific methodology. However, some simple guidelines can often quickly identify many arguments that are not worth evaluating. I once tried to supply a simple set of guidelines for this purpose ("Scientists and Psychics," in *Science and the Paranormal,* ed. by G. O. Abell and B. Singer, 1981, pp. 137-141). The following questions were the key to my guidelines:

1. How reliable is the source?
2. How recent is the research upon which the claim is based?
3. Has the original investigator been able to successfully replicate the findings?
4. Have the phenomena been replicated by an independent investigator in another laboratory?
5. Does the original report conform to the standards required for observing human performance?

I maintain that if such questions are addressed to all the known cases in which scientists endorsed the paranormal claims of psychics, not one of the instances over the past 130 years would survive as worthy of further evaluation. Even the best reasoning procedure will produce nonsense if the material to which it is applied is untrustworthy. And, outside of the four major parapsychological journals, it is almost impossible to encounter paranormal claims based on evidence that can be trusted to be as reported. The moral is that, in most situations, it is a waste of time to try to evaluate the underlying argument.

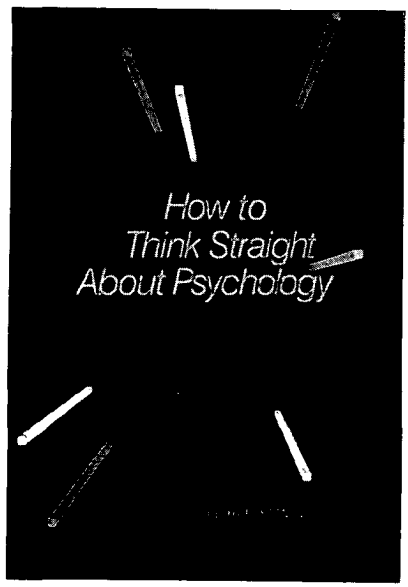
Nevertheless, I would recommend that you purchase *A Field Guide to Inductive Arguments* and conscientiously work through the exercises. The price is right. I can imagine many worthwhile ways to put the manual to good use. As just one example, meetings of local skeptics groups could do the exercises, especially the group ones, and discuss the results. The same procedures could be applied to currently topical arguments for the paranormal. When notes are compared and results discussed, I suspect many differences in how to evaluate claims will emerge. These differences, in turn, could stimulate efforts to develop more coherent and effective means for presenting the skeptical case. And they should also help to protect us from the dogmatism and irrationality that we usually attribute to believers. •

Clear Thinking About Human Behavior

How to Think Straight About Psychology. By Keith E. Stanovich. Scott Foresman, Glenview, Ill., 1986. 178 pp. Paper, about $11.00.

Wayne Bartz

"Critical thinking" is currently a hot item in higher education, some state legislatures even mandating that college course outlines specify the chosen method for encouraging this elusive skill. The California State University system now designates certain courses that satisfy the critical-thinking requirement—you can't graduate without it. CSICOP and the growing skeptical movement are built upon a foundation of critical thought, so most readers of this journal will probably view the systematic encouragement of it as a positive development in our educational system.



Introductory psychology courses, the most popular lower-division offering in American colleges and universities, are not Johnny-come-lately to this area of concern. Many psychology professors will maintain that the bottom line for a good intro course is to get students thinking scientifically and more critically about human behavior, the sole facet of the natural world still widely enshrouded in prescientific thinking and muddle-headed mythology. The fact is that we are all forced daily to function as students of human behavior, with the result that while we may not all claim to be experts in any other academic area (e.g., math), we indeed can conclude quite happily that we have our own clear understanding of human behavior based upon our own lifetime of personal experience. Psychology is just common sense, isn't it?

Enter Keith E. Stanovich and his new book, *How to Think Straight About Psychology.* It is of interest not just to psychology students but to anyone interested in critical thinking. Stanovich nicely illustrates from the outset how thoroughly confused the general public is about psychology and the scientific study of human behavior, carrying the reader pleasantly through the sometimes difficult steps necessary for understanding what a "science of behavior" really means. For the reader who believes that theories are just hunches, and thus that the "theory of creationism" has equal merit to the theory of evolution, Stanovich explains the concepts of

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falsifiability and operationism and shows how all ideas are not necessarily equal no matter how fervently one might happen to believe in them. For the viewer of TV talk-shows promoting various authors and seers with every known variety of hocus-pocus substantiated by endless unchallenged testimonials and case histories, Stanovich looks at placebo effects and establishes the utter worthlessness of testimonials and anecdotes as scientific evidence. For the person who has read in any of several popular books that just thinking intensely enough and positively enough about success will magically produce it (and wonders why it seems to work so well for Shirley MacLaine, but fails to produce results for them), Stanovich offers helpful insight into the seductive process of systematic self-delusion.

For the college student who expects an introductory psychology course to explore in detail the exciting area of parapsychology with its latest amazing discoveries, Stanovich illuminates why most psychologists remain unimpressed by parapsychology:

> The reason ESP, for example, is not considered a viable topic in contemporary psychology is simply that its investigation has not proven fruitful. . . . After more than 70 years of study, there still does not exist one example of an ESP phenomenon that is replicable under controlled conditions. This simple but basic scientific criterion has not been met despite dozens of studies conducted over many decades. . . . It is for this reason alone that the topic is now of little interest to psychology. . . . In short, there is no demonstrated phenomenon that needs explanation. [pp. 160-161]

For a public exposed to headlines and media excitement over sudden "scientific breakthroughs," Stanovich describes the reality of slow and painstaking scientific testing and the development and synthesis of data, thus assigning claims of a "totally new understanding" from some "new Einstein" to the world of pseudoscience. For the individual who, like most of us, has been struck by the seeming improbability or even impossibility of unusual events in his or her personal life, Stanovich delineates the simple human inability to accurately assess the probability of chance events in day-to-day living.

In short, Stanovich has done a nice job answering many of the standard questions that so readily occur to those who are uncritical about human events and empirical data ("But what about my Uncle Walter? He was walking home from work one day when . . ."). The book is written at a higher reading level than the general public might prefer, so I suggest that it be read only by my "A" students with a solid twelfth-grade reading level. (Would you believe that some of our introductory college texts zip along at the eighth-grade level?) For college students or anyone interested in critical thought, *How to Think Straight About Psychology* is a worthwhile classroom or library addition. •

Implausibilities Shown to Be Plausible

The Blind Watchmaker. By Richard Dawkins. W. W. Norton, New York, 1986. 332 pp. Cloth $18.95.

Gordon Stein

THERE HAVE been many books written in the past few years about the evolution/creationism controversy. Since scientists have begun to take the threat of forced teaching of creationism seriously, a number of them have studied the arguments of creationists and have done a respectable job of refuting them. My personal favorite among these books is *Abusing Science,* written by Philip Kitcher, a philosopher of science. The creationist barrage goes on unabated, however. One explanation for this is, of course, that it is a religiously motivated crusade, conducted by people who are desperately trying to prevent the further erosion of their world-view. The frightening thing, however, is that surveys show that about 50 percent of the students of today think that creationism is as valid an explanation of origins as evolution is and that it should be taught alongside evolution. Somewhere along the line, our children are not being taught how to reason. This is where Richard Dawkins's *The Blind Watchmaker* comes in.

Dawkins, a British biologist, has made what appears to me to be the first attempt to allow the layman to examine the whole underlying basis of both evolution and creation: Does there seem to be purpose and design in nature? Is purpose a necessary concept in the first place? Is it possible to explain the "wonders of nature" without the idea of design or that of purpose being invoked, or are these necessary concepts? This is indeed going to the heart of the matter, for much of the argument of creationists is based upon the idea that design and purpose are both evident and necessary. Dawkins's own position can be seen from the title of the book. He feels that if there is a "watchmaker" who designed the living world on earth, he must be blind, for such design is not visible.

Dawkins shows over and over that most creationist arguments are effective only if they are directed to the scientifically illiterate. Unfortunately, there are far too many of those available to listen. His argument is also with the neo-Darwinians, such as Stephen Jay Gould, whom he claims are confusing the issue. He feels that the punctuated equilibrium idea of a major evolutionary change developing suddenly and rapidly becoming infused into organisms is contradicted by his own ingenious computer models of evolutionary change. Rapid large change was introduced in response to a perceived need to advance the timetable of evolutionary change and to account for "gaps" in some areas of the fossil record. All of this is unnecessary, Dawkins argues, as we must not conceive of genes as if they contained miniature blueprints of an entire organism. His computer simulations have shown that small changes, arising at random, will be compounded in future generations to introduce sufficient variation to support gradual Darwinian evolution.

Dawkins is quite good at identifying the seeming implausibilities in evolutionary

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theory and in showing why those very things are indeed plausible. In addition to being a fine writer, Dawkins has a real grasp of the proper limits of scientific thought. The current paradigm of science is materialistic. That means that only physical causes and effects that can be measured directly or indirectly are allowed as explanations or potential explanations in the science of today. If there is strong evidence of some phenomena in nature that *cannot* be explained within a materialistic paradigm, then we may have to change that paradigm. That *can* happen, but first we have the obligation to see if we can't find an explanation that is adequate for all phenomena observed within the materialistic paradigm. If we can, we ought to try to explain the mechanisms of evolution without the need to invoke a supernatural force (which is not allowed in current science). Dawkins thinks he has indeed found such an explanation, and it seems to work.

An example is in order. When creationists try to "stump" evolutionists (or impress an ignorant layman), they point out that the eye of vertebrates is such a complicated structure that it cannot be explained by gradual evolution. What, they say, would be the advantage of half an eye? There is no survival advantage of an eye until it is functional, they say, and that could not have been achieved in a single evolutionary step. Of course, as Dawkins ably points out, this is an incorrect formulation of the problem. A "half of an eye" *is* useful, but it would not be literally one-half of a vertebrate eye of today. It would start as the light-sensitive tissue of an early organism and would develop into a more sensitive area, without a lens. The lens is the last part of the complex vertebrate eye to develop evolutionarily. That this is indeed the case can be seen from the two entirely different types of eye that have developed: the vertebrate eye and the octopus eye. The octopus, a mollusk, has independently developed an eye that is "wired" in the opposite fashion from a vertebrate (and human) eye. All of the "wiring" (nerves carrying the visual impulse to the brain) in vertebrate eyes sticks up right in front of the retinal cells that receive the light. This is, as any engineer would tell you, poor design. The octopus, in contrast, has got the design "right." His wiring is all behind his retina. Why would a designer do it two different ways, once clumsily (as in humans) and once properly, as in octopuses?

Again and again, Dawkins takes on some of the toughest problems for evolutionary theory and shows that it *does* offer a perfectly credible explanation for how that structure or organism might have evolved. Most of the time, the "problem" came from an improper formulation of the concepts of evolutionary selection. "Random" and "chance" are two very dangerous words when applied to natural selection. A variation may have arisen by chance (although not be uncaused), yet its spread through the population via selection is anything but random or by chance.

This is a brilliant, well-written, and original work. If read with some thought, it will go far in helping the nonspecialist in evolutionary theory to understand the process of evolution. It can also be helpful in attempting to educate intelligent laymen (and students) about how to think like a scientist and not like a theologian when trying to do science. •

Little Flavor, No Fun

The Sasquatch and Other Unknown Hominoids. Edited by Vladimir Markotić; Associate Editor, Grover Krantz. Western Publishers, Calgary, Alberta, 1984. 335 pp. Paper $13.00.

Michael R. Dennett

OF THE MANY books written on fringe-science topics, those devoted to monsters have tended to be of the poorest quality. *The Sasquatch and Other Unknown Hominoids* is no exception. Indeed it is an awful book that merits review primarily on the basis of the authors' numerous academic and scientific credentials.

Although the title page indicates that Vladimir Markotić (Ph.D. in anthropology, Harvard) is the editor, the book seems more the work of the associate editor, Grover Krantz (Ph.D. in anthropology, Minnesota). Krantz contributes three of the book's twenty-one chapters (Markotić has only one) as well as an introduction to each contribution by the other authors. As an associate professor of anthropology at Washington State University, Krantz has gained considerable notoriety in the press as one of the leading proponents of Bigfoot. This book provides him with a platform to launch his ideas.

It is clear that Krantz is sure of his position. It is also clear that he is an angry man. He is angry at the scientific establishment. Science, according to Krantz, "is generally not in the business of investigating the unknown, but rather it is working out minor details of principles that are already accepted." He adds that "many major scientific breakthroughs are made by amateurs or by those who are only marginally in the field in question." He states that his colleagues shun Bigfoot research "because they fear their scientific reputations would be damaged if it became known that they were even interested in such things, let alone investigating them."

Krantz is angry at skeptics because "they refuse to look at what evidence there is available, and try to discourage the gathering of more data." And he is angry at fellow believers because many are opposed to his call for a Bigfoot to be shot in order to prove that one exists. He argues that "proving the Sasquatch's existence by killing one specimen might lead to investigations which would eventually save the species."

As for motives, Krantz infers that his are altruistic. He writes that his "participation in the search for Sasquatch brings no significant reward: in fact it cost much in time, money, and professional reputation. . . ."

Not so, says Bil Gilbert, a freelance writer and a vigilant, if skeptical, watcher of the Bigfoot phenomenon. In a feature article in *Sports Illustrated,* Gilbert reveals that Krantz does expect to be rewarded in his hunt for Bigfoot. Writing of his meetings with Krantz and his wife, Gilbert reports that "they talked about how their lives will change, not *if* but *when,* they get the first [Sasquatch]. . . . Krantz plans to sell it—whole or in pieces—to museums for several hundred dollars. Then he will

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take a sabbatical and the couple will make a lucrative round-the-world lecture tour."

The Sasquatch and Other Unknown Hominoids, although dominated by Krantz, provides the varied views of 17 other authors and researchers. Certainly one of the more entertaining contributions is the chapter by Dmitri Bayanov (member of the Board of Directors of the International Society of Cryptozoology), titled "The Case for the Australian Hominoids." Bayanov asks: "Is it really and merely a coincidence that the hominoids of Australia and those described by Jonathan Swift in *Gulliver's Travels* bear the same name?"[1] Before you can answer that question Bayanov tells the story, à la the *National Enquirer,* of a *white* woman raped by an Australian Bigfoot, or Yowie. The result was a "mutant" born in 1874 or 1875. According to eyewitnesses, the mutant "was more animal than human . . . and ate like a pig, grabbing at her food with her long, hairy hands." After relating more stories Bayanov concludes: "Much of the mystery and deification or condemnation of the creature in historic times is due to the fact that he has been a potential, and sometimes actual, diluter of the human race."

Other chapters in the book are just as silly. Loren Coleman (B.A., M.A., presently instructor of cultural anthropology, Bunker Hill College, Boston) informs us that a species of "rather free-ranging, swimming, nocturnal ape . . . exists throughout the southern part of the United States." He bases this conclusion on information gathered from newspapers, James Moseley's *Saucer News,*[2] *Saga* magazine, and the *National Enquirer.* Additional support for his ideas are provided in quotes from Jerome Clark, associate editor of *Fate* magazine, and the late Ivan T. Sanderson, a writer of various wild and woolly tales.

Markotić, the editor, contributes a rambling thesis in which he speculates that the Greek god Pan was a reference to "some early hominid(s) who survived somehow," were observed, and were incorporated into folklore as gods. Markotić is unconvincing but readable. A chapter by Grant R. Keddie (B.A. in archaeology, Simon Fraser) deals with Indian stories about "Cannibal Women" and "Drowned Humanoids." Keddie's narrative is difficult to understand, particularly so in parts because of the use of unintelligible Indian words.

The Patterson-Gimlin film is dragged out and much is made of Sasquatch footprints. Archie Buckley, a Bigfoot enthusiast, explains in his contribution that most of the footprints must be real because they could not have been hoaxed. Buckley also argues that Krantz's interpretation of the Bigfoot tracks are almost all wrong. He quotes Krantz as concluding from imprint evidence that "the center line of the tibia in the human foot is about 25 percent forward . . . but in the Sasquatch foot it is 31 percent forward." Concludes Buckley, "I find no field evidence to support this."

The book fails to address several key questions regarding Bigfoot. Why, for example, do Ohio and Michigan seem to have as many Bigfoot sightings and track reports as Oregon and Washington?[3] How could such huge creatures, allegedly numbering as many as 2,000 in Oregon/Washington, escape conclusive detection for more than 200 years? And what could be the relationship between such far-flung, but apparently similar, creatures as Bigfoot, the Abominable Snowman, and the Yowie?

Even for the credulous reader the book has many failings. Little of the flavor and none of the fun of the Bigfoot movement are found within the pages of this book. There is no hint of the rancor that exists between Bigfoot buffs. Rene Dahinden, author of the book *Sasquatch* and a contributor to this book, has labeled as fake an important Sasquatch footprint that Krantz has authenticated. Dahinden has also been quoted as saying, "Krantz isn't a scientist; he's a mental case." For his part Krantz has said that Dahinden, without academic credentials, will "be shoved aside"

when the first Sasquatch is found. The "scientists," says Krantz, "will move in and take over and Rene Dahinden is dead."

The predominant theme of the book is the idea that Sasquatch is a creature akin to Neanderthal man or a similar relic of the past. Other views, like those of veteran Bigfoot hunter J. E. Beckjord, are simply not mentioned. Beckjord maintains that there "is no proof that Bigfoot, etc., etc., *exists as a real animal* [emphasis added] . . . most probably [it is] paranormal."

The Sasquatch and Other Unknown Hominoids is bad science and, taken as a whole, bad writing. The tragedy is not that this book was published but rather that it is not what it could have been. There certainly is a story to be told about why people believe in Bigfoot and the Abominable Snowman. There is also room for real science in the study of this phenomenon. Instead, Krantz, Buckley, and Dahinden tell us that some witnesses can't fool them, that some of the tracks can't be fakes, and that the Patterson-Gimlin film can't be a hoax!

The argument for Bigfoot rests on the promoters' ability to interpret the evidence and judge it authentic. The public and the scientific community remain unimpressed because obviously such evaluations are highly subjective. If Krantz and others really want to sway anyone, they could start by putting something behind their assertions. They could do this by offering a challenge, like Randi's, for $10,000, to anyone who could prove that any item of Bigfoot "evidence" was fake after the item had been endorsed as authentic by the person(s) offering the challenge. Then, any endorsement of a sighting or footprint would really mean something.

Until some real evidence comes to light there is no reason for anyone to take Sasquatch promoters seriously, especially if this book represents their best effort.

Notes

1. The name used by Swift was "Yahoo." In the twentieth century the term "Yowie" has come into use in Australia to refer to a creature like Yeti or Bigfoot.

2. *Saucer News,* now called *Saucer Smear,* is a UFO newsletter published by James Moseley. It is noted for its tongue-in-cheek approach to all topics, including UFOs and Bigfoot.

3. In 1978 there were 28 sightings and 310 track and print reports of Bigfoot in Michigan. See *Discover,* October 1980, p. 6. •

From Witchcraft to Pseudoscience

Entertaining Satan: Witchcraft and the Culture of Early New England. By John Putnam Demos. Oxford University Press, New York, 1982. 543 pp. $29.95.

Michael R. Dennett

IN SEVENTEENTH-CENTURY New England, in more cases than not, the verdict in trials of individuals accused of being witches was "Not guilty."[1] This is just one of the tidbits of information about the witch trials in early America found in John Demos's book, *Entertaining Satan.* It is rich in historic detail excavated from old court records at the cost of untold hours of research.

Entertaining Satan is an important look into the past, and in particular it provides a view of how the paranormal was viewed three centuries ago. Demos gives the reader in-depth characterizations of some of the alleged witches (no light accomplishment in view of the incompleteness of available data). He also makes some effort to analyze the New England communities and their role in the events. It is is in the assessment of seventeenth-century New England and of witchcraft and how it relates to our day that this book fails.

Discussing the idea of witchcraft and the trials, the author writes: "Our own culture accords a measure of tolerance to such conflicts; but in early New England the situation was probably quite different." He refers to the New England of this time as "premodern" and implies a connection between witchcraft and the premodern nature of the society.

Although Demos never defines the premodern society, the implication is that it is different from a modern society. He also suggests that early New Englanders were psychologically quite different from us, and he showers the reader with a host of terms without explanation. He concludes, "Witchcraft belonged, first and last, to the life of the little community." The evidence, much of it from his own book, suggests something quite different.

The case of Elizabeth Morse, her husband, William, and their grandson John Stiles is illuminating. The Morse house began to have "various 'diabolical' assaults" in the form of moving objects and strange noises. In "modern" terms the Morse case was one of a classic poltergeist occurrence, much like that of the Columbus poltergeist in 1984. (See *SI,* Spring 1985.) Indeed, much of the Morse case is identical to the Columbus case, and in other areas the similarities are striking. In each instance, an adolescent living away from the natural parents is the focus of attention. In each instance, when the child is absent the poltergeist phenomena stop. And in each instance we have clear evidence that the child is the source of the unusual activities.

Regarding the Morse case, Demos quotes the following report: "Caleb Powell . . . on coming to William Morse's house, and the old man being at prayer, he thought [it was] not fit to go in, but he looked in the window. And . . . he saw the

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boy play tricks . . . and among the rest that he saw him [i.e., John Stiles] to fling the shoe at the said Morse's head" (pp. 148-149).

In the Morse case, as well as in the Columbus case, many people reject the idea that the adults could be fooled by the children. The author writes: "And what of their grandson Stiles? . . . We should be careful, in the first place, about ascribing his 'tricks' to conscious, planful mischief. If he actually did throw a shoe at his grandfather—and if, too, he directly caused many similar misadventures—he may have done so quite unknowingly" (p. 150).

Parapsychologists have made similar claims about recent poltergeist cases. William Roll, a well-known parapsychologist, questions James Randi's explanation of the events in the Columbus case, just as the Demos seems to question Caleb Powell's.

Compare the following one-paragraph descriptions of three separate events linked to witchcraft or poltergeists:

> Thursday night . . . we heard a great noise without against the house; whereupon myself and wife looked out and saw nobody . . . but we had stones and sticks thrown at us, . . . and then the like noise was upon the roof of the house . . . [Later] I saw the pot turn itself over and throw down all the water. Again, we saw a tray with wool leap up and down and throw the wool out . . . two spoons [were] throwned off the table. . . . [Quoted in Demos, pp. 132-133]

> Neighbors who saw the stones fall on the outside of the house reported the rocks were warm when they picked them up. Other observers, inside the house, testified that stones dropped apparently from the ceiling. [At one point] Mrs. Lorraine McClean gathered up sixteen stones from the kitchen floor in a single day.[2]

> . . . A comb flew from under a lamp on the bedroom dresser. . . . Buckets of water took on life and upset periodically. [Mr. Ward] was not amused when a pail overturned on a shelf and doused him with an unexpected shower. Laundry baskets acquired the shakes, and tin cans careened across rooms.[3]

The first description was penned nearly three centuries ago by William Morse. Morse did not believe his grandson capable of causing the events described, nor did others in the community. The second paragraph refers to events that took place in Mount Diablo, California, in the late 1950s. Two young boys who lived with their grandparents were the perpetrators. The third set of events occurred in Hartsville, Missouri, at about the same time as the second. The overturned buckets and flying comb were not the product of witches or poltergeists but of Betty Ward, age nine years.

In both of the latter cases scores of people, including Remi Cadoret, an associate of J. B. Rhine, were fooled into believing some supernatural event had occurred. In the comparison of events and the reactions of many people, today's inhabitants of America don't seem very different from "premodern" New England.

Witchcraft was a capital crime in New England. Apparently, many people were accused of witchcraft because they were objectionable or eccentric members of the community. Although this may seem far removed from our time, some small closed societies even today are capable of similar excesses. I offer the Reverend Jim Jones and his settlement at Jonestown, Guyana, as one example.

There are other strong ties between witchcraft in seventeenth-century New England and the pseudosciences of today. But perhaps the greatest similarity is the almost absolute reliance on eyewitness testimony. Witnesses in witchcraft trials often reported that the accused had been transformed into an animal (often a black cat) or

had been seen in two places at once.

The records show that in a significant number of cases the magistrates overturned convictions, an unusual procedure for a capital case. The rules of English law worked for as well as against the alleged witch. This meant that the accused had the right to call witnesses on her own behalf and argue her case. Since lawyers then, as now, knew the value of a good offense, many of the witch trials were actually suits for slander against witch accusers. In these suits the alleged witch was almost always successful. In one instance, when the jury found in favor of the defendant (the witch accuser), the magistrate overturned the ruling in favor of the alleged witch.

Certainly the record seems to indicate that a broad base of skepticism *might* have been present in New England. The author argues against this. He virtually ignores the idea of skepticism except within the limited boundary of the law. Magistrates might have doubted the testimony but not the idea of witchcraft, he argues.

Having spent most of the book trying to explain witchcraft as a function of a premodern intellect, the author suddenly finds he has painted himself into a corner. How can he explain the abrupt disappearance of witchcraft with the close of the seventeenth century? Despite his psychological terminology in arguing to explain the end of witchcraft, he does not seem persuasive.

Finally, grudgingly, the author concedes (p. 394) that the abrupt halt in witchcraft proceedings was in part the result of "a new climate of caution and skepticism." This skepticism, says Demos, centered solely on the problem of "proving the identity of particular witches" and not on the possibility of witchcraft.

Why not? If, like modern people, premodern individuals could be credulous, is it not possible that skeptics existed in those times too? Can't we explain the sudden end of witchcraft in terms of a skeptical backlash to the Salem trials of 1692-1693? If we are to agree that old New England was so radically different from that of today, the author bears the burden of proof. *Entertaining Satan* goes far to demonstrate just the opposite: that a commonality exists between then and now.

In his preface, Demos explains his approach to the subject. He tells the reader that witchcraft is a subject in which "feelings grow unusually—albeit 'superstitiously' —strong." The reason for *his* strong feelings are revealed when the author explains that there is a genealogical connection between himself and some of the early Puritan witch accusers. He states that, because of this connection, "my project would have an aspect of personal closure—even, perhaps, of exorcism."

As a researcher, Demos rates an A+; as a historian, he does not get such a high mark. But *Entertaining Satan,* despite my criticism, is well worth taking the time to read, especially if one looks for aspects of modern man in seventeenth-century garb.

Notes

1. Author John Demos excludes, in my opinion correctly, from his survey the Salem trials (1692-1693) as an aberration and not representative of the era.
2. *ESP, Seers and Psychics,* by Milbourne Christopher, New York, 1970, p. 144.
3. Ibid., p. 145. •

Some Recent Books

Campbell, Steuart. *The Loch Ness Monster: The Evidence.* Aquarian Press, Wellingborough, Northamptonshire, U.K., 1986, 128 pp. £3.99, paper. A critical evaluation of the principal evidence for a large creature in Loch Ness. Good, straightforward critical analysis. Separate chapters skeptically evaluate eyewitness accounts, above-water still photos, above-water film and video, underwater photographic evidence, sonar and radar evidence, and evidence from other lakes. A "Summary and Personal View" lists the failures of each type of evidence and concludes that Nessie does not exist. "It is a chimera, no more real than the centaur or the griffin."

McGervey, John D. *Probabilities in Everyday Life.* Nelson-Hall Publishers, 111 N. Canal St., Chicago, IL 60606, 1986, 269 pp., $23.95, cloth. A comprehensive introduction to daily applications of probability analysis by a physicist and educator (and CSICOP scientific consultant). Chapter 3, "Uses and Abuses of Statistics," contains short sections on "Statistics in Science and Pseudoscience," "Astrology," "Biorhythms," and "The Lunar Effect."

Science and the Paranormal: Exploring the Edges of Science. Southern California Skeptics, P.O. Box 5523, Pasadena, CA 91107, 1987. 72 pp. $6.50, paper. Attractive and substantive compilation of brief articles on psychic phenomena, fringe science, and scientific controversies from *Laser,* the newsletter of the Southern California Skeptics. Thirty-one articles arranged in seven categories: Creationism; Firewalkers, Fakirs, and Record-Groove Readers; Medical Controversies; Parapsychology and Other Scientific Controversies; Perpetual Motion Machines; Psychics and Ghosts; UFOs and Ancient Astronauts.

Skehan, James W. *Modern Science and the Book of Genesis.* National Science Teachers Association, 1742 Connecticut Ave. NW, Washington, DC 20009, 1986, 30 pp., paper. Booklet for science teachers provides guidance in dealing with the science/creationism controversy. The author is a scientist and theologian. He brings both viewpoints to bear on the problem of making distinctions between science and religion that do justice to both.

Bibliography

Leith, Thomas H. *The Contrasts and Similarities among Science, Pseudoscience, the Occult, and Religions: A Bibliography,* 4th ed. Professor Harry Leith, Department of Natural Sciences, Atkinson College, York University, Toronto, Canada, 1986, 207 pp. Updated version of bibliography of books and articles listed in 41 categories, e.g., Astrology, Glossolalia, Miracles, Parapsychology, Religion and Science, and Testing Evolutionary Theory.

—*Kendrick Frazier*

Articles of Note

Allen, Paul L. "Psychics' Crime-Solving Claims Often Don't Match Facts, Skeptics Conclude," *Tucson (Arizona) Citizen,* March 9, 1987. News report on study by Tucson Skeptical Society of claims that psychics have assisted in locating murder victims and solving crimes in Tucson area. Not one case proved out. Police and sheriff's officials say they follow up psychics' tips just as they do anyone else's, but they report that, contrary to the psychics' claims, there is no instance where information from a psychic has solved a case.

Burrows, Robert J. L., "A Christian Critiques the New Age," *Christianity Today,* May 16, 1986 (reprinted in *Utne Reader,* March/April 1987, pp. 86-96). A thoughtful Christian critic examines the New Age movement—theories and therapies based on premises of the so-called ancient wisdom of Eastern mysticism and Western occultism. (The March-April *Utne Reader* follows this with another feature, "Five Heavies Critique the New Age: Is It Over?")

Colburn, Don, "AIDS Is Generating New Growth Industry for Health Charlatans," *Washington Post,* January 13, 1987. News article on the way ignorance, fear, and lack of cure for AIDS are perfect for scams promising false cures and hopes. The FDA is investigating a douche touted as a "disease-fighting agent against AIDS," something called "Anti-AIDS Formula" ($200), and a supposed anti-AIDS pill "available without a prescription."

Dahl, Jonathan, "Icons Shedding Tears Are a Mixed Blessing to Congregations," *Wall Street Journal,* January 30, 1987, p. 1. Journalistic feature on the "mixed blessing" of the recent spate of icon "miracles," such as a painting of the Virgin Mary that supposedly began to weep in a Chicago church. They may deepen faith, "but all too often they also generate ugly crowds, bizarre behavior and even violence."

Dietrich, Bill, "The New Army Experiment with 'New Age' Philosophy," *Seattle Times,* January 21, 1987, p. 1. Report on how the U.S. Army tried "New Age" thinking, including the idea that the mind has invisible but tangible powers yet to be tapped, at centers in Fort Ord, California, and in Washington, D.C. Emphasis on Lt. Col. Jim Channon, who is quoted, "When I was in combat, I could sense the presence of other people 400 to 500 meters away without seeing them. That's ESP."

Hines, Terence M., Paul Lang, and Karyn Seroussi, "Extrasensory Perception Examined Using a Reaction Time Measure," *Perceptual and Motor Skills,* 64:499-502, 1987. Experimental report by Pace University psychologists makes use of a new way of evaluating claims for ESP. ESP research has depended almost exclusively on measures of accuracy—percent of correct responses—as the determinant factor. The authors describe the use of another method, a modified

standard reaction-time measure of cognitive processing. This sensitive reaction-time measure is known to detect very low activation in internal cognitive processing. In a series of experiments, they found no evidence of extrasensory processing, or ESP.

Holden, Constance, "Textbook Controversy Intensifies Nationwide," *Science,* 235:19-21, January 2, 1987. Report on recent court cases and censorship attempts, reflecting a broader conflict over values.

Johnson, Robert, "Popularity of Novel Health Tests Worries Many Doctors, Regulators," *Wall Street Journal,* January 21, 1987, p. 25. Report on vendors of health and fitness tests based on such things as hair analyses and stress. "Many of these tests are under growing fire from physicians, regulators and insurers, who claim they are often unnecessary, inaccurate, or misleading."

Lewin, Roger, "Creationism Case Argued Before Supreme Court," *Science,* 235:22-23, January 2, 1987. Report on arguments heard on the Louisiana creationism statute.

MacDonald, Carol L., "The Real Ghostbuster," *American Way,* October 15, 1986, pp. 34 ff. Feature on Paul Kurtz, CSICOP, and the SKEPTICAL INQUIRER.

Manne, Rolf, "Avalanche Dowsing," *Nature* (Correspondence), December 4, 1986. Norwegian chemist notes critically that the Norwegian Red Cross Mountain Rescue Organization officially advocates dowsing as an effective method for finding victims of avalanches. It was used in a March 1986 avalanche in which 16 young Norwegian soldiers died, with results indicating that in the absence of external visual clues the outcome is no better than a series of guesses. Manne adds that dowsing is not accepted by the Norwegian police. The Norwegian Geotechnical Institute, responsible for scientific studies of avalanches, has taken a firm stand against the technique.

McKean, Kevin, "The Orderly Pursuit of Pure Disorder," *Discover,* January 1987, pp. 72-81. Excellent article on scientific inquiries into randomness, and misperceptions about it. No explicit mention of fringe-science matters, but such problems as why a random-number generator based on radioactive decay might not be random after all and why common, strongly held misperceptions about other endeavors of chance (coin-flipping, card-shuffling, the "hot hand" in basketball) are nevertheless very relevant. Among them is the tendency to find spurious patterns in sequences that are random. Randomness may be as much a matter of mind as of math.

Paulos, John Allen, "Orders of Magnitude," *Newsweek,* November 24, 1986. Guest essay by mathematician laments innumeracy in United States—the lack of intuition for common numbers, magnitudes, and probabilities. "One unappreciated consequence of innumeracy: a predisposition to believe in pseudoscience."

Reidinger, Paul, "Creationism and the First Amendment," *ABA Journal,* January 1, 1987, p. 35. Opinion research poll of 578 lawyers finds that 63 percent believe that the teaching of creationism in public schools does not violate the First Amendment. But 81 percent agree that the First Amendment does not prohibit the teaching of "secular humanism" in the public schools.

—*Kendrick Frazier*

Follow-up

Statistics in Dean's Astrology Article

Geoffrey Dean (*SI*, Winter 1986-87, p. 180) reports the results of seven independent studies in which subjects had to decide which of two or more [astrological] charts fitted them best." The results were as follows:

No. of subjects	12	18	38	34	15	83	30
Charts per subject	3	6	2	3	5	3	2
No. picking own chart	4	3	19	10	2	28	15
Chance "expectation"	4	3	19	11	3	28	15

As Dean implies, the results suggest strongly that subjects cannot tell right charts from wrong ones. But they also suggest that the results are too good to be true. There are only two of the experiments in which the observed number did not agree exactly with the expected number (rounded to the nearest integer where necessary), and in these two exceptions the deviation was only 1. The chance of getting so good a fit is 0.000296, or about 1 in 3,000. This suggests that one or more of the experimenters may have stopped experimenting just when the observed number was equal to expectation. This "optional stopping" would not matter in a Bayesian analysis; but, for the sake of simplicity, I have used a non-Bayesian analysis that is good enough to make my point. In a scientific approach one should not overstate one's case.

I am enclosing a copy of the theory and calculations leading to the probability 0.000296.

I. J. Good
Dept. of Statistics
Virginia Polytechnic Institute and State University
Blacksburg, Va.

I agree whole-heartedly with the implied conclusion in Geoffrey Dean's article on astrology (Winter 1986-87) that astrology has no validity, but find the evidence cited by him in Table 1 of the article a bit hard to believe. This table lists seven studies

showing the number of times subjects were able to pick out their own astrological charts from among two or more charts, one their own and the other or others of other subjects chosen at random, and comparing these numbers with the most probable numbers expected by chance. In five of the seven studies, the number shown as observed is exactly the same as the most probable number, a result that seems to me to be most improbable.

I reproduce most of that table below and show beside each line the probability of the most probable value in the cases where the observed and most probable expected value were the same, and of the observed values being within the range shown of the most probable value in the others.

			No. Picking Own Chart		
Study	No. of Subjects	Charts/ Subject	Observ.	Most Prob. Chance Val.	Prob. of Correspondence Found
Cummings et al.	12	3	4	4	.24
Neher	18	6	3	3	.24
Lackey	38	2	19	19	.13
Dwyer and Grange	34	3	10	11	.42
Tyson	15	5	2	3	.66
Carlson	83	3	28	28	.14
Dwyer	30	2	15	15	.14

It may be noted that in only two of the studies, and those of the two cases where there was a divergence between the two values, do the probabilities of the correspondence found approach or exceed 0.5, which is the expected median value. While in the case of each individual study, the probability of the correspondence is within acceptable bounds, the concatenation of the other five studies at such low values is difficult to accept.

Paul A. Reeves
Santa Fe, N.M.

Subsequent to receiving the letters from I. J. Good and Paul A. Reeves, to which Geoffrey Dean replies below, we received letters raising the same question from several other readers. Among them were Steven P. Willner of the Center for Astrophysics in Cambridge, Massachusetts; Timothy Prout of the Department of Genetics at the University of California, Davis; William H. Wing of the Department of Physics at the University of Arizona; and Michael Wierzbicki, Department of Psychology, Washburn University of Topeka. Because of their similarity and our shortage of space, we are unable to publish them, but we do thank those readers as well for their comments and evaluations.—ED.

Geoffrey Dean replies:

Are the results too good to be true? To answer this question I have combined and extended the analyses by Good and Reeves in the following table:

No. of subjects	Probability of getting Obs. = Exp. ± x, where x is: 0	1	2	3
12	.24*	.64	.89	.97
18	.25*	.66	.90	.98
38	.13*	.37	.58	.74
34	.14	.41*	.64	.80
15	.25	.67*	.90	.98
83	.09*	.27	.44	.58
30	.14*	.42	.64	.80
Overall p =	.000004	.005	.074	.26

*Category into which actual result falls.

Column 0 is Good's a_r, the difference between columns 1 and 0 is Good's b_r, and the asterisked results are Reeves's probability of correspondence found. Overall p (which is what we are interested in) is obtained by multiplying together the probabilities in each column.

Depending on the value we adopt for x, the overall p ranges from astonishingly low to unremarkable. So what value should we adopt? Both Good and Reeves adopt the miniumum value that the results allow, i.e., 1, and conclude that something special may be happening. This is like selecting a card and pronouncing the result significant at the .02 level, i.e., 1/52, which of course is meaningless unless you specify the card in advance. If we adopt $x = 2$ instead of $x = 1$, then the results are within chance.

Clearly such after-the-event analysis can decide nothing. But it does raise suspicions that demand investigation. So let us examine six possible scenarios:

1. I fudged the figures. Since you will rightly suspect any undocumented assertions on my part, I have provided the Editor with photocopies of the original source material.

2. There are many studies, but I cited only those that disprove astrology. No doubt many studies exist, such as those by TV shows and those lying unpublished in dusty files, but I know of no other published studies. If they exist, then I am eager to hear about them.

3. Exclusion of results for other ranks makes the fit seem better than it really is. Where relevant (i.e., more than two charts per subject) and available (some authors give no data), the details are as follows:

No. of subjects	Rank of authentic chart 1	2	3	Exp.
12	4	7	2	4
34	10	19	5	11
83	28	33	22	28

In each case only rank 1 shows a good fit with expectancy.

4. The experimenters are bigoted skeptics who unashamedly biased their results. But not all were skeptics. Inspection reveals no hint of a corresponding difference in

outcome between those who were astrologers (Dwyer, Carlson), those who were skeptics (Neher, Lackey, Tyson), and those who were both (Cummings et al., Dwyer and Grange).

5. The experimenters are part of a giant conspiracy. But the results were published in generally such diverse and obscure places that experimenters were quite unlikely to know that the others existed.

6. It is due to ESP and morphogenetic fields. No comment.

In summary: Yes, the results do seem too good to be true, but there are no grounds for suspicion. Add them to your list of such coincidences as 22 successive reds in roulette.

Geoffrey Dean
Analogic
P.O. Box 466
Subiaco 6008, Western Australia

I. J. Good responds to Geoffrey Dean's reply:

In view of his scholarly work *Recent Advances in Natal Astrology,* I would not suspect Geoffrey Dean of cheating; and his letter shows that, if there was any cheating, it was perpetrated by one or more of the researchers whose work he quoted. But mistakes can be made; one that is easy to make is to write down an expected number as if it were the observed number. This seems to have occurred under Dean's item #3, where the row of numbers 4, 7, and 2 add up to 13 instead of 12. This suggests that the observed number of successes in the experiment in which there were twelve subjects was really 3 and not 4. According to my calculations (a copy supplied) this would raise the *P*-value from about 1/3,000 to .001037, nearly equal to 1/1,000, which is a little easier to accept as a coincidence. If just one more copying error of this kind is unearthed, I would no longer be much disturbed by the "too goodness." A seventh scenario must be appended to Dean's list: namely, that one or more of the experimenters made a copying error.

These results depend on a little combinatorial calculation and provide more accurate results than would be obtained by using the more familiar chi-squared test, which, however, happens to be essentially equivalent to the test I used. The *P*-values obtained by using the chi-squared approximations are about 1/2,000 (in place of 1/3,000), and 1/500 (in place of 1/1,000), so the chi-squared approximations are not much different from the accurate *P*-values that I computed combinatorially. The chi-squared test was used in a similar manner by R. A. Fisher (*Annals of Science,* 1:115-137 [1936]) to show that Mendel's results in his genetics work were *much* too good to be true.

The analogy with choosing a card in a pack is a poor one because I used the most obvious criterion for testing the hypothesis—that the results were too good to be true, a hypothesis that is not in the least far-fetched.

Neither is the analogy with 22 successive reds in roulette a good one; because, although the chance of 22 successive "same colors" is 2^{-21}, which is about 1/2,000,000, the number of opportunities at Monte Carlo has been no. of years × 365 × several hundred per day, which is something like a million or more.

Since Dean agrees that the results do look too good, any differences between us relates to the statistical theory (apart from the fact that I have now shown how an

error in the data might well have occurred). I hope that the SKEPTICAL INQUIRER will be careful to live up to its claim to be scientific and never relapse into "lawyer's mode." In particular, this *sometimes* requires that statistical analysis should be carried out by one or more professional statisticians. It is too bad that the analysis cannot always be fully understood by every reader of the SKEPTICAL INQUIRER.

I. J. Good

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We hope that these brief explanations help you understand some of the problems you may encounter. Please rest assured that the SKEPTICAL INQUIRER staff is working very hard to resolve them as quickly as possible.

From Our Readers

The letters column is a forum for views on matters raised in previous issues. Letters are more likely to be published if they are brief and typed double-spaced. They may be edited for space and clarity.

Animals, behavior, and biases

I read the article about Clever Hans, the counting horse (*SI*, Summer 1986), and the letters in response (Winter 1986-87). As a professional biologist with more than a passing interest in animal behavior, I have some comments.

Sebeok points out that some of the ape language experiments resemble paranormal research. It is understandable that some of the Chimpskyites who have diapered and reared animals in their homes would have a strong desire to see their children's performances measure up to their hopes and expectations. This may be analagous to the work of some parapsychologists whose religious desire to believe in miracles is so strong that they consciously or unconsciously are careless with their data or biased in their interpretation.

I find it ironic that today the question is of possible bias in favor of animal intelligence, for we are just emerging from a long history of bias in the other direction. Our legacy from the most anthropocentric religions the world has known has been a prejudgment that man is separate from the natural world and superior to other animals. Until fairly recently it was accepted that one of the characteristics of the human species was that we were the only tool-using creatures; but use of tools is fairly common among birds and mammals, and a bluejay has been photographed making a tool to the specifications needed for its task (*Science*, 180:1,076, 1973). Until recently the idea that birds could learn an abstract concept (distinguish between symmetric and asymmetric figures, *Z. F. Tierpsych.*, 47:299, 1978; know that the food is under the object that is different, *J. Comp. & Physiol. Psych.*, 47:288, 1954) would have been considered absurd.

Therefore, I am not overly impressed with Sebeok's quotes from Chomsky and Lorenz that language is exclusively human and its discovery in another species would be a miracle.

Wayne H. Davis, Professor
Thomas Hunt Morgan School
of Biological Sciences
University of Kentucky
Lexington, Ky.

Quantum correlations

I was startled to see that Martin Gardner slipped badly in his article on the EPR (Einstein-Podolsky-Rosen) paradox (*SI*, Winter 1986-87). Referring to the quantum mechanics (QM) of two particles with correlated spins, he says, ". . . if the measured particle goes through a second detector and is measured a second time, it may have (with a probability of 0.5) a spin opposite to what it had before. If so, the other particle instantly changes its spin!"

Quantum mechanics may seem "spooky," but it is not that spooky; there are several errors in Gardner's statement:

1. A prompt second measurement of the same quantity on the same particle

must always agree with the first measurement. If it did not, one could never demonstrate that one had indeed measured any property of the particle.

2. The statement implies that spin is a single quantity, whereas it is a vector quantity with three components. If, after measuring the z component of spin, you subsequently measure the x component, you will find a positive value or a negative value with equal probability (0.5).

3. No measurement of the spin of particle A can cause particle B to change its spin. Rather, the first measurement on A determines the spin of both particles (if they were correlated). After this determination has been made, there is no further correlation; a subsequent measurement of a *different spin component* of A does not influence a measurement of that component of B.

4. There is zero probability that a prompt second measurement of the same component of the spin will give a value "opposite to what it had before." However, a measurement could be made along an axis that is tilted at a small angle from the original measurement axis, and in that case there is a small probability that the spin will be *almost* opposite to what it was before. (See J. McGervey, *Introduction to Modern Physics,* 2nd ed., Academic Press, 1983, pp. 294-296, for a detailed discussion.)

5. The statement implies that you could transmit a message instantaneously from A to B; the *transmitter* simply makes a series of spin measurements on A, and the "receiver" observes what happens to B. That would violate relativity, but no measurable contradiction has been found between QM and relativity.

David Mermin gave an excellent overview of the EPR paradox in *Physics Today,* April 1985: "Is the Moon There When Nobody Looks? Reality and the Quantum Theory."

John D. McGervey
Professor of Physics
Case Western Reserve University
Cleveland, Ohio

Martin Gardner replies:

Professor McGervey is of course right. If the situation were as I described it, one could indeed violate relativity by sending a binary-coded message faster than the speed of light. If a particle did not have the desired spin for a particular bit of the message, you simply keep measuring until it shifts to that spin.

A longer, more technical letter from physicist Jon J. Thaler, sent to me personally, made the same points as did McGervey. "A variation of the EPR paradox has been verified over astronomical distances," he added, "at least for pairs of particles (photons) moving in almost the same direction (they must enter the same telescope). The two-photon correlation is known as the Hanbury-Brown-Twist effect. . . . A couple of years ago I had a physics student who was interested in studying the possible connection between QM and ESP. . . . It took nearly an entire semester for him to understand the problem of measurement in QM well enough to analyze the situation properly."

I am consoled by Thaler's last sentence; also by the fact that there is no better way to learn something about QM than to write about it carelessly and hear from the experts.

Another shyness effect?

Amid all the hoopla and sensationalism of the West Pittston, Pennsylvania, haunted house affair (*SI,* Winter 1986-87), considerable effort was made by some to cloud the real issues in order to sustain their own positions and credibility. Following are a few facts that should help shed light on that situation.

1. I was twice invited to go to the Smurl house by Jack Smurl. It was odd that he was not at home when I arrived with members of the Paranormal Investigating Committee of Pittsburgh (PICP), since he had told me he would meet with us upon our arrival. It was even more

strange that, when he finally did come home, he was literally pulled into the house by his daughter, even though we had been promised an opportunity to speak with him upon his return. He was obviously not being allowed to talk to us.

2. I never in any way tried to misrepresent myself as a professor from any university. It is true that everyone on our committee, except for me, is on the faculty of the University of Pittsburgh.

3. I told Mrs. Janet Smurl that I was not *Dr.* Busch and had no university identification. She clearly understood this and refused my offer to leave. In fact, she asked me to stay! It is therefore incomprehensible that she later created this confusion over our credentials.

4. Mr. Edward Warren, the demonologist in charge, admitted to me that he knew "exactly" who I was, but tried to pass me off as a curiosity seeker. Even after we told him we were there at the behest of CSICOP, he simply advised us to read the newspaper accounts.

5. Warren said that "at the proper time" he would release videotapes that actually showed demons. Now that the danger is gone and the house on Chase Street is safe from supernatural terror, where are the tapes?

Similarly, I was recently invited to be on KDKA-TV's "Pittsburgh 2-day" show. I have been a guest on this program before, and they wanted me to ask Hans Holzer, the famous ghost-hunter, some quality questions from the audience. I agreed, with the understanding that Holzer not be told of my presence in advance, because I thought his reaction would be exactly what it was. Someone on the show's staff accidentally mentioned my name to Holzer just minutes before airtime. Holzer exploded and threatened to leave unless I was expelled from the building. The staff capitulated, although, actually, I watched the show from the control room and was promised an appearance on the show in the near future.

Perhaps it isn't the well-known "shyness effect" that inhibits ghosts from appearing to skeptics, but a far more mundane characteristic of some researchers that prevents science from learning the secrets of these apparitions from the world beyond.

Richard Busch, Chairman
Paranormal Investigating
Committee of Pittsburgh
Pittsburgh, Pa.

The writer is a magician and mentalist as well as chairman of PICP.—ED.

The Suffolk 'UFO' lights

While I have to endorse Ian Ridpath's conclusion that no UFO landed in Suffolk and agree that there was no physical evidence for such a landing, I must disagree with his identification of some of the lights responsible for the reports (see *SI*, Fall 1986). I must also correct Robert Sheaffer's deficient and misleading account in his column in the Spring 1986 issue.

Almost certainly the incident was stimulated by the sight of the fireball that fell at 0250 GMT on December 26, 1980, but Thurkettle's lighthouse hypothesis is not convincing. Since when, for instance, was a lighthouse beam triangular, and when did it ever show red and blue lights? Orford Ness shows a white light. Then why does Ridpath assume that the "red light" reported by Halt in his paragraph 3 was the same light as that reported in paragraph 1?

Ridpath concluded that the tape-recording gave him no reason to modify his conclusions, but in fact it contains some data that should have caused him to do so. Halt recorded the azimuth of the "red light" as 110° to 120° magnetic (i.e., 105° to 115° true). Since the Orford Ness lighthouse lies on a bearing of 95° true, this light could not be the lighthouse. Nor was the light always "red"; at times it seemed to be yellow (or white tinged with yellow). A "small' light that appeared to be "a quarter to a half mile" away is not consistent with the 5-million-candela beam of a lighthouse only 8.6 km away.

What Halt saw was the half-million-candela beam of the Shipwash Light Vessel 18.2 km away on a bearing of

110° true. Its light has a characteristic pattern that is more consistent with what Halt reported than that of Orford Ness.

But in the tape, somewhere between 0148 and 0244, Halt reported seeing *two* separate lights side by side. How does Ridpath explain that? My explanation is that the second light was the bright star Spica; at 0155 it lay only 1.75° (inc. refraction) above the horizon exactly in line with Shipwash. A few minutes earlier it was lower and to the left. Since it rose at 0140, the star was not seen earlier than that, and by 0155 it was invisible again behind Shipwash's light.

If Orford Ness was not responsible for the lights seen on December 29, was it yet the light seen in the forest on December 26? Surely not! Here we have no direction, but we do have a description. This description, especially the red and blue lights, is consistent with the appearance of a star, where the colors are due to spectral spread (caused by atmospheric refraction). Normally the red should be below the blue, and Halt may have the colors reversed. The triangular shape could have been due to a mirage, which, apart from enlarging the image, may also have inverted it, thus placing the red above the blue. At 0300 Spica lay 9° above the horizon in the ESE, but two other first-magnitude stars were also low on the horizon. Vega and Deneb both lay at an altitude of 8°, the former in the NNE and the latter to the north. Since Vega is by far the brightest of the three, it must be the prime suspect.

The relevant part of the tape transcript can be found in my article "Throwing Light on Rendlesham" in *Magonia*, 21 (December 1985), pp. 15-18.

Steuart Campbell
Edinburgh Scotland

Ian Ridpath replies:

Understandably, my identification of the Orford Ness lighthouse as the flashing light seen by Col. Halt and his men from Rendlesham Forest has been questioned. Fortunately, Col. Halt's tape of the event contains information that allows us to identify the flashing light unambiguously. On the tape, we hear an airman call out the flashes: "There it is again . . . [pause] . . . there it is." The interval between these two calls is five seconds. The flash rate of the Orford Ness lighthouse is also five seconds. My field notes describe the light as orange, although the perceived color would vary with atmospheric conditions. My explanation for the second light spotted later in the night is that it was the Shipwash lighthouse. This is visible faintly from the edge of the forest, but it is not visible from inside the forest where the first and brightest flashing light was seen. From my own observations, the only flashing light visible from the alleged landing site is the Orford Ness lighthouse. Col. Halt's quoted compass bearing is not a precise reading. It is an estimate made on the move, at night, while weaving between the trees of Rendlesham Forest, and so has a wide degree of error.

Fresh air on fringe dentistry

I recently received my first, very welcome copy of the SKEPTICAL INQUIRER (Fall 1986). As chance (or the Fates) would have it, I opened to the well-written article by John Dodes concerning dentistry. Hallelujah, brother! I would like to post this erudite exposition of the many philosophical shortcomings of our dental education in a prominent place in my reception room for the enlightenment of my patients.

I, too, have been warning my patients for years about the "busyness" problem in dentistry and of the charlatans who wait for them out there if they should have to relocate. As armament against abuse I provide them with a list of members of the Academy of General Dentistry for their region. These dentists are required to attend 75 hours of continuing education every three years or be dropped from the Academy. The discipline of the AGD, unlike other societies that only require dues money, helps to ensure that a patient will come into the loving hands of one who has actively engaged himself in meaningful educational courses (and might even have passed a more comprehensive Fellowship written examination)

not replete with the usual Mickey Mouse courses Dodes mentioned.

Not many dentists have the time or background to delve into the intricacies of scientific method (we are a motley lot), but most have a deep commitment to the health of their communities. Yes, there are shysters out there, but the public soon finds them out and abandons them.

Thanks again for this breath of fresh air. I look forward to many years of fascinating reading.

Donald E. Wagner, D.D.S.
Amherst, N.Y.

"Operation Reason"

If the editor's note to my letter, "Astrology columns" (*SI*, Winter 1986-87), is correct, journalists are "independent," and "take great pride in resisting pressures from whatever direction," except from their readers, where they are apparently as soft as putty even to the point of pandering to the credulous. This is not a very consistent or helpful characterization from the editor, who claims to be a knowing journalist.

The purpose of my letter was to propose "Operation Reason"—a plan to improve the deplorable meager response of the media thus far to CSICOP's 1,200 letters asking editors to attach a short disclaimer to horoscope columns. My letter was a generalization of what I had done in Austin—namely, I asked the director of the MacDonald Observatory, Harlan Smith, of the University of Texas at Austin, to arrange a visit to the Observatory for Arnold Rosenfeld, the editor of the *Austin American-Statesman*. Rosenfeld duly visited the observatory and wrote a friendly account of its work. A few days later the disclaimer appeared at the end of the *Statesman*'s horoscope column. A gleeful letter from Prof. Smith announcing that fact appeared in the student newspaper of the university.

Why I should be publicly lectured for my actions by *SI*'s editor, with such words as "we must work with them, not against them," "a positive approach is much more likely to be successful than a negative one," becomes only too obvious from the following considerations.

The most serious problems of pseudoscience in the era of mass communications are above all professional problems of the journalists and editors of the media, as is clearly recognized by CSICOP's astrology initiative. But it is now increasingly clear that those who are part of the problem are not making and will not make the decisive contributions to their solution. Rather, they are only too likely to confirm Shaw's adage that "all professions are conspiracies against the laity." And they may dissipate our energies, albeit unconsciously, in defensive, diversionary maneuvers, including lectures about being "negative."

Lawrence Cranberg
Austin, Texas

More on belief questionnaire

Regarding the Jones, Russell, Nickel Scale of Belief in the Paranormal (see Jerome Tobacyk's article in *SI*, Fall 1983), the complaint in P. A. Berent's letter (Spring 1985) that one item is conjunctive is not answered by Prof. Woods (*SI*, Summer 1986), though it is briefly acknowledged by Dr. Tobacyk (*SI*, Winter 1986-87). In fact, many of the items are conjunctive, which is best avoided in an objective questionnaire.

Moreover, many of the items are distorted by unnecessary emphasis. On a five-point scale (as used by Tobacyk) this could lead to such dubious responses as, "[I agree (but not strongly) that] I firmly believe that ghosts or spirits do exist," or "[I don't know whether or not] I am firmly convinced that reincarnation [occurs]." Simple statements like "Ghosts exist" would produce more appropriate responses.

Furthermore, a high score is taken to indicate a strong paranormal belief, but the results are distorted by questions 24 and 25; both are phrased as irrational statements, but a respondent who agrees that ESP has already been proved is

unlikely also to agree that it is likely to be proved one day.

Though no statistician, I am a bit suspicious of Dr. Tobacyk's claim that an item may have inadequacies at the content level and yet show statistical and psychometric properties that appear quite satisfactory as a measure of paranormal belief. Isn't this a bit like saying that you are going to accept a respondent's ambiguous answer as a "Yes" because you think he would have answered yes if your question had been less ambiguous?

David Simpson
Nat. Inst. of Public Admin.
Lusaka, Zambia

Ghostbusting and deception

Robert A. Baker's "How to Bust a Ghost" (*SI*, Fall 1986) appeared to be more the work of a smart aleck than that of an objective researcher.

The people described were not frauds or scoundrels, but ordinary people disturbed by what they perceived to be a genuine threat—namely, ghosts. It is not the reality of spirits that is at issue, but rather Prof. Baker's readiness to deceive his clients and hold them up to ridicule. If he felt that a belief in ghosts is nonsensical, why did he indicate otherwise to his clients? Why did he play out those elaborate—and condescending—charades? To have done so strikes me as fundamentally dishonest. One can only wonder how those clients would have felt reading Baker's account, one in which they were portrayed as childlike simpletons, perhaps because their beliefs were not consonant with Baker's beliefs.

One must also wonder why his opinions of his clients' problems are any more valid than their own. To claim, for example, that amorphous psychological "explanations" like guilt, childhood traumas, and helplessness accounted for the behavior of client DF and his wife are at the same time naive and smug, as is Baker's description of DF's wife as having "deeper conflicts and sexual hangups," since the article suggests that Baker met with DF on only one occasion and with DF's wife not at all! You call that science?

The widespread use of deception in psychological research and practice is a major concern to the profession; the procedures described in Baker's article do little to modify the widespread belief that most psychologists are liars. It is also disturbing that *SI*, in publishing this sort of article, does nothing to address the issues I have described.

Mark B. Fineman, Chairman
Dept. of Psychology
Southern Connecticut
State University
New Haven, Conn.

Robert A. Baker responds:

It seems Dr. Fineman is particularly incensed because I did not attempt to impress my own lack of belief in ghosts on my clients and tell them there is no such thing as ghosts and be done with it. He seems to resent the fact that I didn't do what he would have done and educate them so they would no longer believe in them. Unfortunately, if I had calmly told them that I was convinced that their ghosts were fantasies and that it would take many years of intensive and expensive therapy before I could rid them of their hallucinatory behavior—many years of expensive scientific *psychotherapy before they would come around to my belief system—this approach would have made Dr. Fineman sleep better at night and no longer worry about psychologists lying to their clients and being unscientific.*

Dr. Fineman is correct in that my assumptions about the particular cause of DF's wife's behavior were merely that—assumptions, which may or may not be correct in her particular case. The point that Fineman seems to have missed is that my approach, which did not cost DF and his wife any money at all, and even very little time, also proved to be effective in solving this particular pair's "little problem of living." Similarly, the treatment applied to haunted houses. The problem here is one of belief. My method is to have the client believe that his ghosts have gone away, and it is, I argue, more effective than getting into a three-to-five-

year psychotherapy session leaving them both brainwashed and broke.

I would also like to remind Dr. Fineman that many kind and gentle and humanistically inclined doctors and therapists "lie" to their clients when such "little white lies" are in the client's own best interests. Moreover, I have never and I never will ridicule or embarrass them or act toward them in an arrogant or condescending manner. I did not in this case, and I have not at any time during my ghostbusting sorties. On the contrary, I respect the client's belief and try to help him get rid of his fears. I assumed that readers of this journal would be sympathetic and of a similar non-ghost-believing turn of mind. I assure you the article would have been different if I were writing for the National Enquirer *or the* Star, *or a science journal. It may be unfair to knock down ghosts. Yet when all is said and done it may be the believers rather than the skeptics who are the greater offenders. For they are the ones who with their superstitions and quackery drug us into a trance of fear and trembling in which we fail to pay attention to the true mystery—man. To quote a friend, "The strangest thing on earth is not ghosts, or reincarnation, or ESP: it is muddled, deluded, and deluding* man."

Ghostbusting technique

Robert A. Baker wrote, in "How to Bust a Ghost: Two Quick But Effective Cures" (*SI*, Fall 1986), that he scared the ghost by angry shouts or by a cacophony of noise from assorted electronic gadgetry.

This reminded me that I have also busted a few ghosts, and by means of a quite different technique. Being a medical practitioner (a physician for children), I have thrice been asked to exorcise a local variety of ghost, called *tokoloshe*—which haunts blacks of the Zulu tribe. No one admits to actually having seen a *tokoloshe*, but it is believed to be a diminutive, perhaps bearded, creature with a monkey- or snake-like appearance and with a nocturnal propensity to crawl up the leg of a bed and render the occupant ill, or else to settle a hex on a room or a house.

My first challenge came some 20 years ago, at the home of my brother and his family. His domestic live-in Zulu servant, Christina, had become convinced that a *tokoloshe* was haunting her room and had provisionally contracted the services of a witch-doctor to exorcise the malevolent influence. But the healer wanted the equivalent of about $40 for his (non-guaranteed) services. I considered that too expensive and decided to tackle the *tokoloshe* myself, and without fee. Late one night I paced along toward Christina's room holding a lighted candle in my left hand while at the same time holding an antibiotic capsule (opened) in my right hand and sprinkling the contents thereof in the doorway and on the windowsill. Christina knew enough of the white man's *muti* (medicine) to have a healthy respect for my ministrations. Not only was she convinced by my action and assurance that henceforth the *tokoloshe* could not enter her room, but she also related the cure to friends. About a month later I received a telephone call from a man who introduced himself as a witch-doctor and asked that I please teach him my technique!

A dozen years ago a Mrs. Gordon implored me for help. Her valued domestic manservant was about to leave. He lived in a couple of rooms on the Gordon grounds. A few nights earlier he had returned home and was upset to see in the dark what seemed to be a small figure loitering at the front door of his habitation. The *tokoloshe* then vanished, but the next day the servant experienced pains in his legs and decided to return to the ancestral farm where an exorcism could be performed to free him from current and future infirmity.

This time, being already experienced, I put on a more elaborate show. I came prepared. I got a large salt cellar from Mrs. Gordon's kitchen, then solemnly donned a Jewish prayer shawl (*talit*) and head-covering (*kipah*, also called *yamelka*) and ostentatiously exhibited my Hebrew prayer book (*siddur*). I then sprinkled salt near the bushes hard by the servant's rooms and more salt at his

doorway. Needing to utter gibberish that he would not understand, I opened the *siddur* at random and began to read in Hebrew. Strange that I should chance on just this passage: *Ashrei yoshvei vetekha* (Happy are they who dwell in thy house—Psalms 84:5). Henceforth, I assured him, his dwelling would be happy, healthy, and blessed.

Having counteracted the *tokoloshe* I parceled up my panoply of power and left. His leg pains disappeared and some months later, when I inquired after his welfare, I learned that tranquility still graced his habitation. There was no fee.

S. Levin, M.D.
Johannesburg, S. Africa

Fun and folly

Reading your Winter 1986-87 issue, I wondered at Uri Geller, an unscrupulous pretender, becoming a "millionaire several times over" while you serious, hard-working debunkers, even debunking Geller himself, continue to scrape for dollars.

Long ago, when I was young, my first wife lay on our bed and cried, saying that I "take the fun out of everything." She had been into licking and sticking Green Stamps and I had merely figured out precisely what each stamp was worth.

Now, 35 years later, my second wife, so different from my first, lightly remarks to me that you, CSICOP, "take all the fun out of life," adding, "Who wants to pay to have something that they wish to believe disproved?"

Rex Rew
Atascadero, Calif.

Early science

It is difficult not to reply to the letter of Andrew B. Crouch in your Winter 1986-87 issue. It is really hard to believe that the first steps of scientific discovery were made in the Western (Christian) world, as both Euclid and Archimedes lived before Christ was born.

John F. Sallee
Missoula, Mont.

Tough Habits of Thought

Finding the occasional straw of truth awash in a great ocean of confusion and bamboozle requires intelligence, vigilance, dedication and courage. But if we don't practice these tough habits of thought, we cannot hope to solve the truly serious problems that face us—and we risk becoming a nation of suckers, up for grabs by the next charlatan who comes along.

—Carl Sagan, "The Fine Art of Baloney Detection,"
Parade, February 1, 1987

Local, Regional, and National Groups

The local, regional, and national groups listed below have aims similar to those of CSICOP and work in cooperation with CSICOP but are independent and autonomous. They are not affiliated with CSICOP, and representatives of these groups cannot speak on behalf of CSICOP.

AUSTRALIA

National: Australian Skeptics, Barry Williams, Chairman, P.O. Box 575, Manly, N.S.W. 2095.

Regional:

Australian Capital Territory, P.O. Box 107, Campbell, ACT, 2601.

Queensland, 18 Noreen Street, Chapel Hill, Queensland, 4069.

South Australia, P.O. Box 91, Magill, S.A., 5072.

Victoria, P.O. Box 1555P, Melbourne, Vic., 3001.

West Australia, 25 Headingly Road, Kalamunda, W.A., 6076.

BELGIUM

Committee Para, J. Dommanget, Observatoire Royal de Belgique, Avenue Circulaire 3, B-1180 Brussels.

CANADA

National: James E. Alcock, Chairman, Glendon College, York Univ., 2275 Bayview Avenue, Toronto, Ontario.

Regional:

British Columbia Skeptics, Barry Beyerstein, Chairman, Dept. of Psychology, Simon Fraser Univ., Burnaby, B.C. V5A IS6.

Ontario Skeptics, Henry Gordon, Chairman, P.O. Box 505, Station Z, Toronto, Ontario M5N 2Z6.

Quebec: Chantal Peré, Secretary, C.P. 96, Ste-Elisabeth, Quebec, J0K 2J0.

FINLAND

Society for the Scientific Investigation of Claims of the Paranormal, Prof. R. Tuomela, Dept. of Philosophy, Univ. of Helsinki, Unioninkatu 40 B, 00170 Helsinki 17.

FRANCE

Comité Français pour l'Etude des Phénomènes Paranormaux, Maurice Gross and Yves Galifret, 16 Rue de l'Ecole Polytechnique, Paris 5.

GREAT BRITAIN

Michael J. Hutchinson, Secretary, UK Skeptics, 10 Crescent View, Loughton, Essex IG10 4PZ.

HOLLAND

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INDIA

National: Indian CSICOP, B. Premanand, Chairman, 10, Chettipalayam Rd., Podanur 641-023 Coimbatore Tamil nadu.

Regional: Bangalore, Dr. H. Narasimhaiah, President, The Bangalore Science Forum, The National College Buildings, Basavanaguidi, Bangalore-560-004.

IRELAND

Irish Skeptics, Peter O'Hara, Convenor, c/o Queens Court, Queens Park, Monkstown Co., Dublin.

MEXICO

Mario Mendez-Acosta, Apartado Postal 19-546, Mexico 03900, D.F.

NEW ZEALAND

New Zealand Skeptics, Chairman, Dr. Denis Dutton, Dept. of Fine Arts, University of Canterbury, Christchurch.

NORWAY

Jan S. Krogh, Norwegian Institute of Scientific Research and Enlightenment, P.O. Box 990, N-9401, Harstad.

SPAIN

Alternativa Racional a las Pseudosciencias (ARP), Luis Alfonso Gámez Domínguez, Secretary, c/o el Almirante A. Gaztañeta, 1-5º D. 48012 Bilbao.

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Sven Ove Hansson, Box 185, 101 22, Stockholm 1.

SWITZERLAND

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UNITED STATES OF AMERICA

Arizona

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Bay Area Skeptics, Robert Sheaffer, Chairman, P.O. Box 60, Concord, CA 94522-0060.

Sacramento Skeptics Society, Terry Sandbek, 4095 Bridge St., Fair Oaks, CA 95628.

San Diego Skeptics, Ernie Ernisee, Secretary, Box 17566, San Diego, CA 92117.

Southern California Skeptics, Ron Crowley, Chairman, P.O. Box 5523, Pasadena, CA 91107.

Colorado

Colorado Organization for a Rational Alternative to Pseudoscience (CO-RAP), Béla Scheiber, President, P.O. Box 7277, Boulder, CO 80306.

District of Columbia, Delaware, Maryland, and Virginia

National Capital Area Skeptics, c/o Stanley K. Bigman, 4515 Willard Ave., Apt. 2204 So., Chevy Chase, MD 20815.

Florida

Florida Skeptics, Humberto Ruiz, 10753 S.W. 104th Street, Miami, FL 33176.

Hawaii

Hawaii Skeptics, Alicia Leonhard, Director, P.O. Box 1077, Haleiwa, HI 96712.

Illinois

Central Illinois Skeptics, Andrew Skolnick, Chairman, 905 S. Lierman, #43, Urbana, IL 61801.

Midwest Committee for Rational Inquiry, Contact person, Sandy Smolinsky, Secretary, P.O. Box 268375, Chicago, IL 60626.

Massachusetts and New England

Skeptical Inquirers of New England (SINE), David Smith, Chairman, Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138.

Michigan

Detroit Association for Rational Enquiry (DARE), Contact person, G. L. Ellery, P.O. Box 19580, Detroit, MI 48219.

MSU Proponents of Rational Inquiry and the Scientific Method (PRISM), Dave Marks, 221 Agriculture Hall, Michigan State Univ., East Lansing, MI 48824.

Minnesota

Minnesota Skeptics, Robert W. McCoy, 549 Turnpike Rd., Golden Valley, MN 55416.

St. Kloud ESP Teaching Investigation Committee (SKEPTIC), Jerry Mertens, Coordinator, Psychology Dept., St. Cloud State Univ., St. Cloud, MN 56301.

Missouri

Kansas City Skeptics, Verle Muhrer, Chairman 2658 East 7th, Kansas City, MO 64124.

New Mexico

Rio Grande Skeptics, Gordon Deppe, 3345 Ridgeline Drive, Los Cruces, NM 88001.

New York

Western New York Skeptics, Barry Karr, Chairman, 3159 Bailey Ave., Buffalo, NY 14215.

Ohio

South Shore Skeptics. Page Stephens, Box 5083, Cleveland, OH 44101

Pennsylvania

Paranormal Investigating Committee of Pittsburgh (PICP), Richard Busch, Chairman, 5841 Morrowfield Ave., #302, Pittsburgh, PA 15217.

Texas

Austin Society to Oppose Pseudoscience (A-STOP), Lawrence Cranberg, President, P.O. Box 3446, Austin, TX 78764.

Dallas Society to Oppose Pseudoscience (D-STOP), James P. Smith, P.O. Box 815903, Dallas, TX 75381-5903.

Houston Association for Scientific Thinking (HAST), Steven Schafersman and Darrell Kachilla, P.O. Box 541314, Houston, TX 77254.

West Texas Society to Advance Rational Thought, Co-Chairmen: George Robertson, 516 N Loop 250 W #801, Midland TX 79705; Don Naylor, 404 N. Washington, Odessa, TX 79761.

Washington

Northwest Skeptics, Philip Haldeman and Michael R. Dennett, Co-Chairmen, T.L.P.O. Box 8234, Kirkland, WA 98034.

West Virginia

Committee for Research, Education, and Science Over Nonsense (REASON), Dr. Donald Chesik, Chairperson, Dept. of Psychology, Marshall University, Huntington, WV 25701.

Wisconsin

Skeptics of Milwaukee, Len Shore, 3489 N. Hackett Ave., Milwaukee, WI 53211.

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ASUPO, Amardeo Sarma, Convenor, Kirchgasse 4, D-6101 Rossdorf.

The Committee for the Scientific Investigation of Claims of the Paranormal

Paul Kurtz, Chairman

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Subcommittees

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Education Subcommittee: Chairman, John W. Patterson, Professor of Materials Science and Engineering, 110 Engineering Annex, Iowa State University, Ames, IA 50011.

Paranormal Health Claims Subcommittee: Co-chairmen, William Jarvis, Professor of Health Education, Dept. of Preventive Medicine, Loma Linda University, Loma Linda, CA 93350, and Stephen Barrett, M.D., P.O. Box 1747, Allentown, PA 18105.

Parapsychology Subcommittee: Chairman, Ray Hyman, Psychology Dept., Univ. of Oregon, Eugene, OR 97402.

UFO Subcommittee: Chairman, Philip J. Klass, 404 "N" Street S.W., Washington, D.C. 20024.

The Committee for the Scientific Investigation of Claims of the Paranormal

The Committee for the Scientific Investigation of Claims of the Paranormal attempts to encourage the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and to disseminate factual information about the results of such inquiries to the scientific community and the public. To carry out these objectives the Committee:

- Maintains a network of people interested in critically examining claims of the paranormal.
- Prepares bibliographies of published materials that carefully examine such claims.
- Encourages and commissions research by objective and impartial inquiry in areas where it is needed.
- Convenes conferences and meetings.
- Publishes articles, monographs, and books that examine claims of the paranormal.
- Does not reject claims on a priori grounds, antecedent to inquiry, but rather examines them objectively and carefully.

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